JULY
18
1958

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

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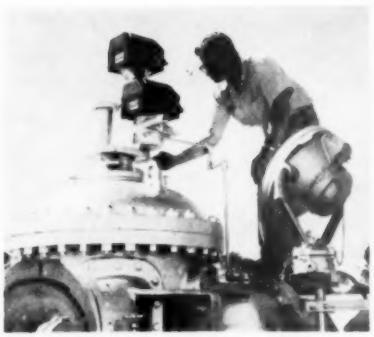

Producers are making a drive for economy unparalleled in recent years. They want more from men, money, and materials 40

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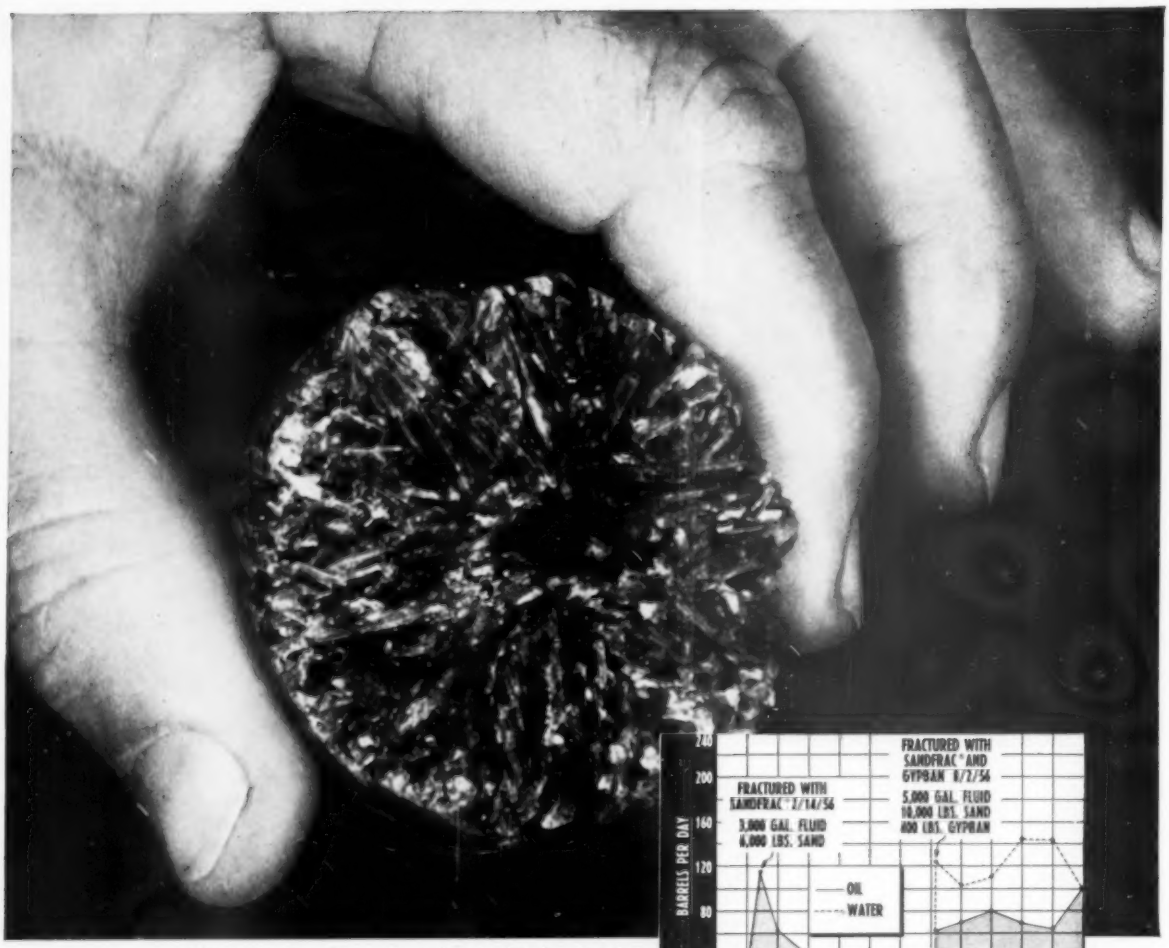
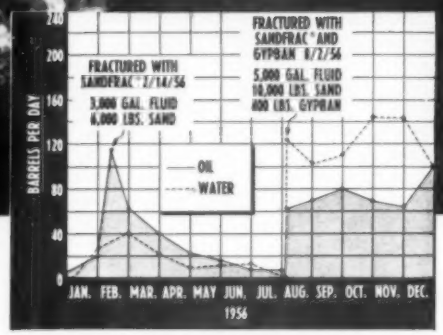


Plugging action of gyp, shown here in this deposit taken from oil well tubing can now be prevented with Gypban.

NEW!

Gypban Prevents Gyp Deposits



Here are oil and water production curves on a well fractured with and without Gypban. Following treatment with Gypban, increased production was sustained for over five months — unrestricted by gyp deposits!

In many wells abnormal production declines result from gyp deposits. Calcium carbonate and sulfate clog formations, collect on rods, pumps and tubing to restrict production. These deposits make frequent workovers necessary—increasing your production costs.

To solve this problem, Dowell now offers Gypban*—a new complex phosphate that acts as a stabilizing agent to retard gyp deposit. Injected into the producing formation, it dissolves slowly in the produced water to give *long-term protection.*

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With Gypban you get sustained protection instead of just temporary relief. Some wells that had previously required monthly workovers to remove gyp now give good production for six months or more after a treatment with Gypban.

The use of Gypban is recommended in any well where gyp deposits are the suspected cause of rapid or unusual decline rates. The formation may be plugged with gyp even though the tubing is free from scale.

Gypban is now available from any of the 165 Dowell service points. In Canada, contact Dowell of Canada, Ltd.; in Venezuela, contact United Oilwell Service. Dowell, Tulsa 1, Oklahoma.

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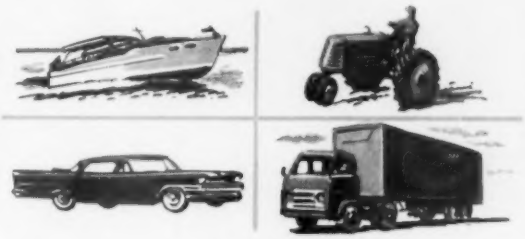
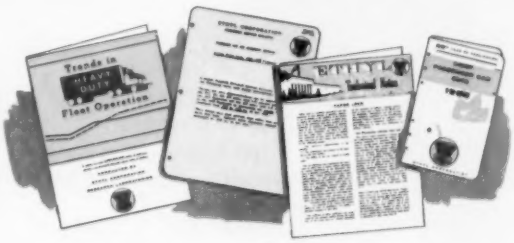
... how Ethyl helps you build customer satisfaction

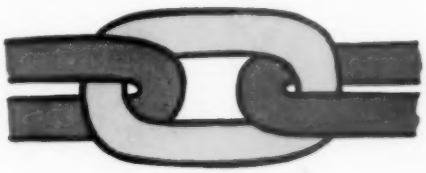


1. In the field, Ethyl automotive specialists work closely with your representatives serving fleet, farm, marine and industrial customers, helping them get the best results with your products.

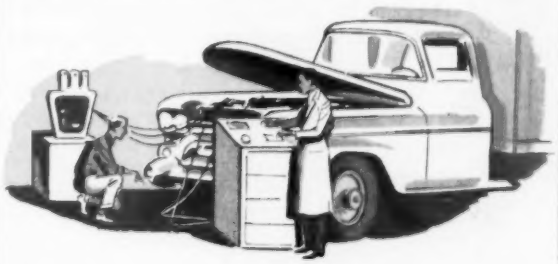
2. Ethyl shares its experience with your people in many ways. One way is in group discussions of technical problems. Another is the presentation of operation studies and market surveys.



3. A continuous flow of technical information from a wide variety of sources is passed along to your automotive people, through reports, brochures and bulletins.



4. Through its contacts with the Automotive Industry, Ethyl keeps your people up to date on new developments and their significance, specification changes, and "field fixes."



5. Another facet of Ethyl service is cooperation in solving your customers' operating problems. This often leads to improved preventive maintenance, insuring greater product satisfaction.

Automotive assistance is an Ethyl service to oil companies... typifying Ethyl's belief that service is every bit as important as product.

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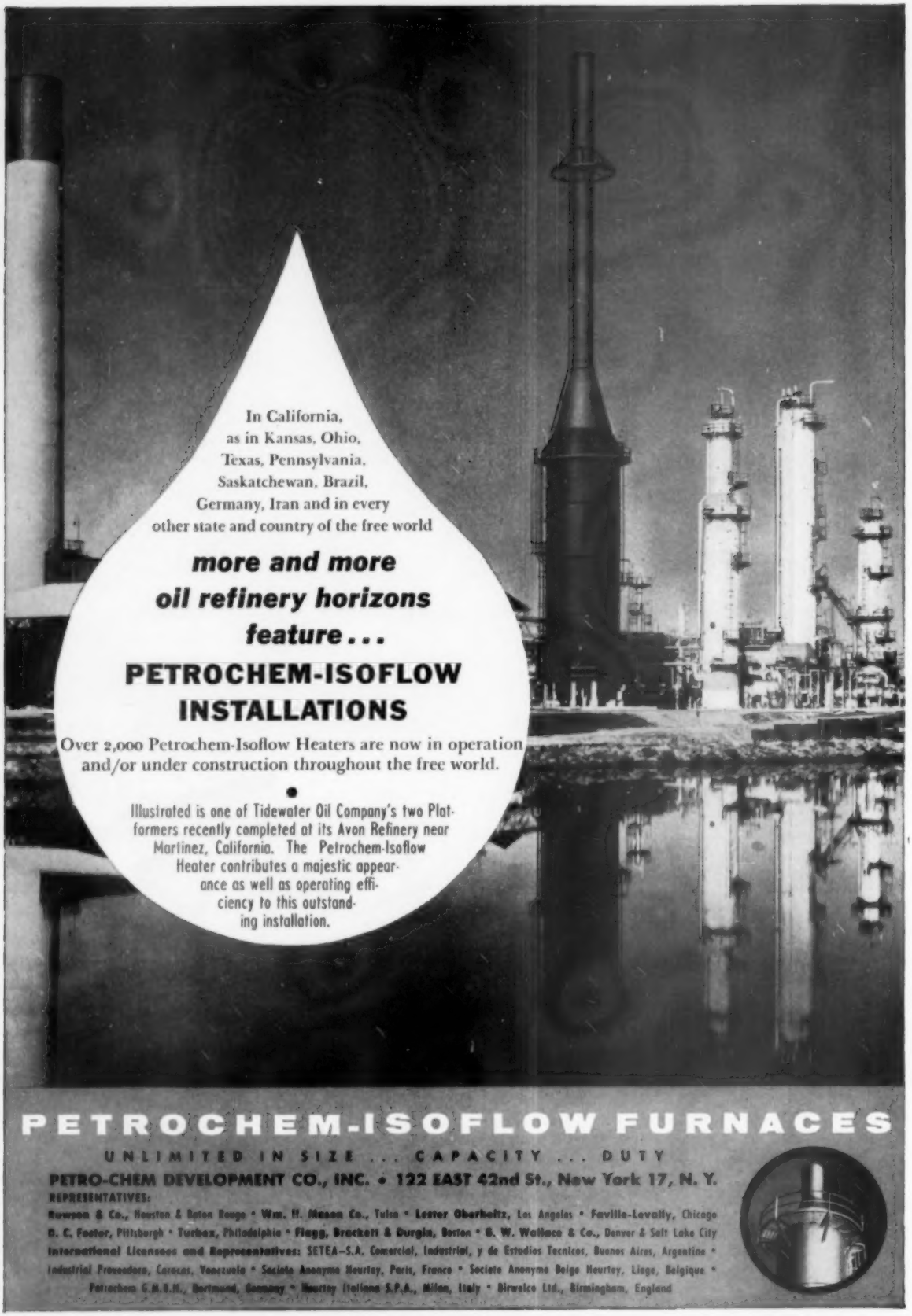
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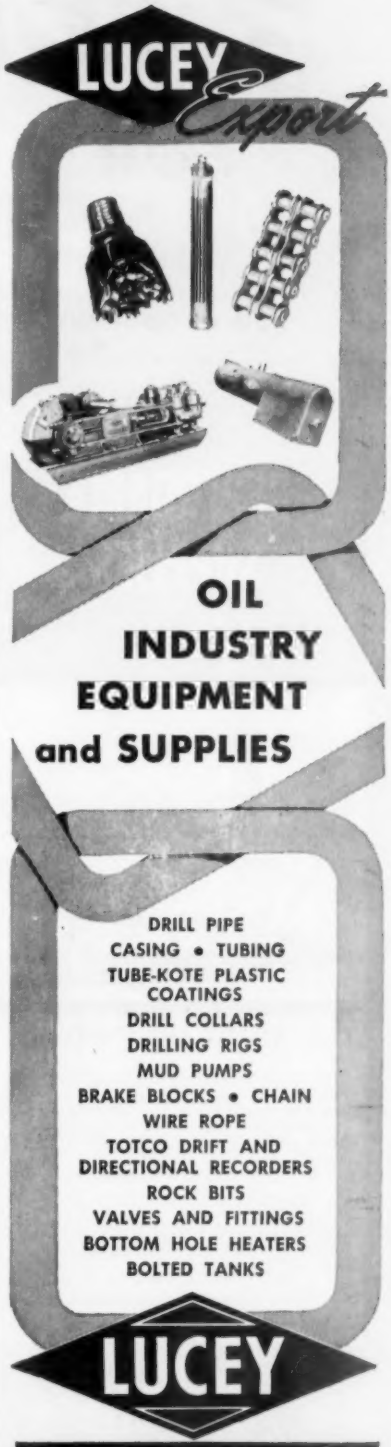

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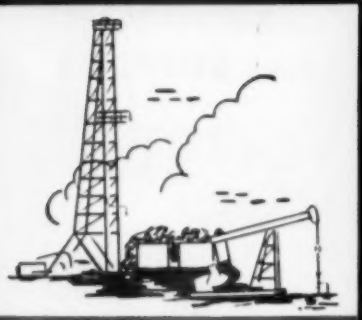

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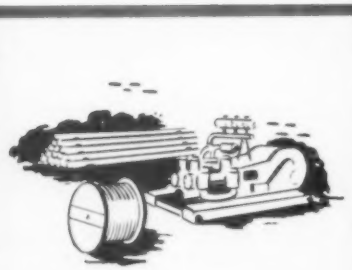

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37 YEARS OF PROGRESS WITH THE OIL INDUSTRY

60-Second Summary / WHAT'S HAPPENING IN OIL

July 18, 1958

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The crisis in Iraq could have far-reaching implications for oil. Western control of the vast Middle East reserves has been shaken for the first time. . . . p. 11

•

One major is testing a new marketing tool—a guidebook to encourage vacation travel. Magnolia Petroleum is testing it in the Southwest. If it's successful, Socony Mobil will publish a nationwide series. . . . p. 80

•

Producers are making their "recession remedies" standard operating procedures. The drive will be for even-greater efficiency to find better uses for techniques now available and to develop new methods for the most economical operations. . . . p. 40

•

The promising wildcat at the southern end of the Persian Gulf has indicated three pay zones. There is a belief that it may have tapped the third offshore field in the Persian Gulf. . . . p. 77

•

Statehood for Alaska may create a better atmosphere for oil operations. Activity has been increasing steadily for more than a year and may rise even faster during the next year. . . . p. 12

•

Europe's smaller nations are growing in importance in oil, though only a few of them have crude production. The big activity is in marketing, which is expanding fast to keep pace with rising demand. Refineries are also expanding. . . . p. 14

•

An East Texas thermal recovery project is showing signs of success after only a few months. The experimental project uses superheated air to ignite oil underground. . . . p. 22

•

Canadians are talking of building a gas liquids pipeline from Alberta to the West Coast. Such an "all-Canadian" line would be popular in view of the increasing charges of U.S. domination of Canadian oil and gas operations. . . . p. 68

•

Technology is helping Alabama's Citronelle field make a comeback. Formation fracturing and use of heaters to aid production of the high-paraffin crude are responsible for the field's new lease on life. . . . p. 32

•

An improved processing technique can make shale oil commercially competitive with natural crude. That's the claim of Oil Shale Corp. and the Denver Research Institute. A $3-million semicommercial plant may be built to complete testing of the technique. . . . p. 72

Up to the Minute / SIGNIFICANT LATE NEWS

AT-A-GLANCE PETROLEUM WEEK Copyright

July 18, 1958

Military officials moved fast this week to guarantee an adequate petroleum supply should the Middle East crisis worsen. The Military Petroleum Supply Agency advised domestic refiners that it may call for stepped-up deliveries under existing contracts.

The revolt in Iraq was less than 24 hours old before government officials started looking for new supply. MPSA made special telephone requests for additional jet fuel, aviation gasoline, and Navy special fuel oil. Unlike the situation when the Suez Canal was closed, the inquiries come at a time when U.S. product inventories are relatively low.

The Military Sea Transportation Service chartered seven tankers promptly. And it expects to make daily fixtures—as do most oil companies—as the crisis continues.

European buyers are also "in the market" for new supply sources. As soon as the overthrow of the Iraq government was known, sudden requests appeared for quick loadings of crude and avgas in the Caribbean, jet fuel in Italy, and for advanced product positions in the U.S.

Machinery for providing emergency petroleum supplies—if needed—already exists. The authority for a foreign supply group is contained in the recently extended Defense Production Act. Another Middle East Emergency Committee—such as was created when the Suez closed—can be formed and put into action on quick notice.

•

George Colley, senior vice-president of Bechtel International, was the first oil industry casualty in Iraq. He was dragged from a Baghdad Hotel by Iraqi soldiers.

•

Imports of "unfinished" products can be continued at the high levels set in May and June under a new voluntary plan. The plan announced this week defines all imported products as unfinished, except for those that require no further processing or only "mechanical blending."

Unfinished oils imported "primarily" for making asphalt will be exempted from controls until mid-September. Meanwhile, all product importers must file import schedules through November with Import Administrator Matthew V. Carson.

•

One major buyer may be set to restore an earlier price cut for Oklahoma crude. Kerr-McGee, the second largest buyer in the state after D-X Sunray, notified producers this week it would buy all allowable "underages," some of which have accrued since May 1, 1957. Kerr-McGee's postings have been 15¢ under most other Oklahoma buyers since mid-March.

•

Ten of the largest gas pipeline companies will ask the Supreme Court to reverse the "Memphis" ruling. They want to appear, when the arguments start in the fall, to support the Federal Power Commission's contention that pipelines will be handicapped and expansion slowed if the lines have to get prior customer approval for rate hikes.

Congrats and $25 to J. A. LONG, Rua Uruguaiana 118 - 9° andar Rio de Janeiro, Brazil

Joe Roughneck, heart of the oil and gas industry, likes the convenience and economy of having Lone Star's ultra-modern pipe mill right in the middle of his workshop. Lone Star maintains the largest mill stock of API casing and tubing in the entire oil country. Delivery can be made overnight to 75 per cent of the active areas. Lone Star's recently enlarged plant is, more than ever, Joe Roughneck's solid source of supply.

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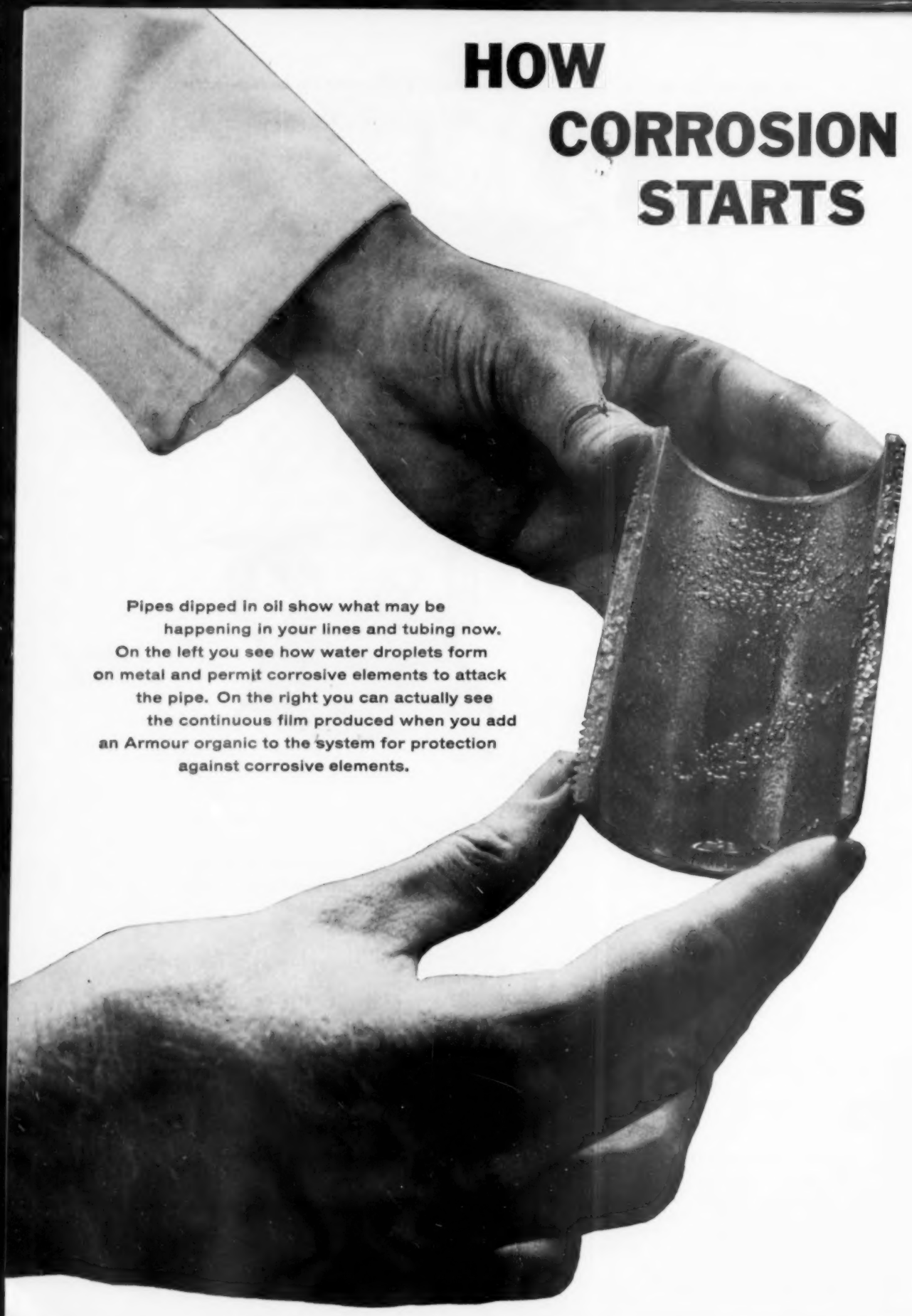
HOW CORROSION STARTS



Pipes dipped in oil show what may be happening in your lines and tubing now. On the left you see how water droplets form on metal and permit corrosive elements to attack the pipe. On the right you can actually see the continuous film produced when you add an Armour organic to the system for protection against corrosive elements.

HOW ARMOUR ORGANICS STOP IT

Duomeens® and Arquads® form continuous films. They lock out water and corrosive elements—give up to 99.5% protection.

In primary and secondary oil recovery operations, Armour organic chemicals offer unmatched protection against corrosion. As little as 10 ppm protects pipes and equipment—above and below ground.

Duomeens and Arquads protect against the corrosive effects of brine, hydrogen-sulfide and other corrosive elements. Because they adsorb continuously on metallic surfaces, Armour organic chemicals are lengthening the life of pipes and equipment, and cutting replacement costs in many oil fields.

• • •

There are variations of these basic Armour inhibitors. Each has characteristics useful in specific applications. They are effective at about 10 ppm in water-flooding, or at about 50 ppm when used as down-the-hole inhibitors, (basis: 100% activity).

Duomeen CD-50: Effective corrosion inhibitor in all water systems. Completely dispersible in water. **Duomeen CDA-50:** Used in systems where carbon dioxide and oxygen corrosion are a problem. Water soluble. **Arquad T-2C:** Particularly effective in fresh water systems. Ranges from water soluble to dispersible. **Armac CD-50:** Especially effective in fresh water systems and low sulphate brines. **Duomeen TDO-50 (Liquid):** An easy to use, oil soluble, water dispersible, down-the-hole corrosion inhibitor. Utilized to inhibit corrosion in salt water disposal systems. **Duomeen TDO (Fluid paste):** 100% active, oil soluble corrosion inhibitor, also used in salt water disposal systems.

Duomeen TDO under varied test conditions

	Control	With Additive	Gals. per 1,000 bbls.**
ASTM Turbine Oil Test	Heavy corrosion	No corrosion	1.7
Revolving Wheel Test H_2S saturated brine-kerosene	39.6 mpy*	3.8 mpy	2.1
Salt Water Disposal System Test Coupons installed at well heads	15 mpy	.5 mpy	0.2

*Mils penetration per year **Basis, 100% Activity

For product samples and descriptive literature on treatment procedures, and applications information for any of these Armour organics, simply write us on your company letterhead.

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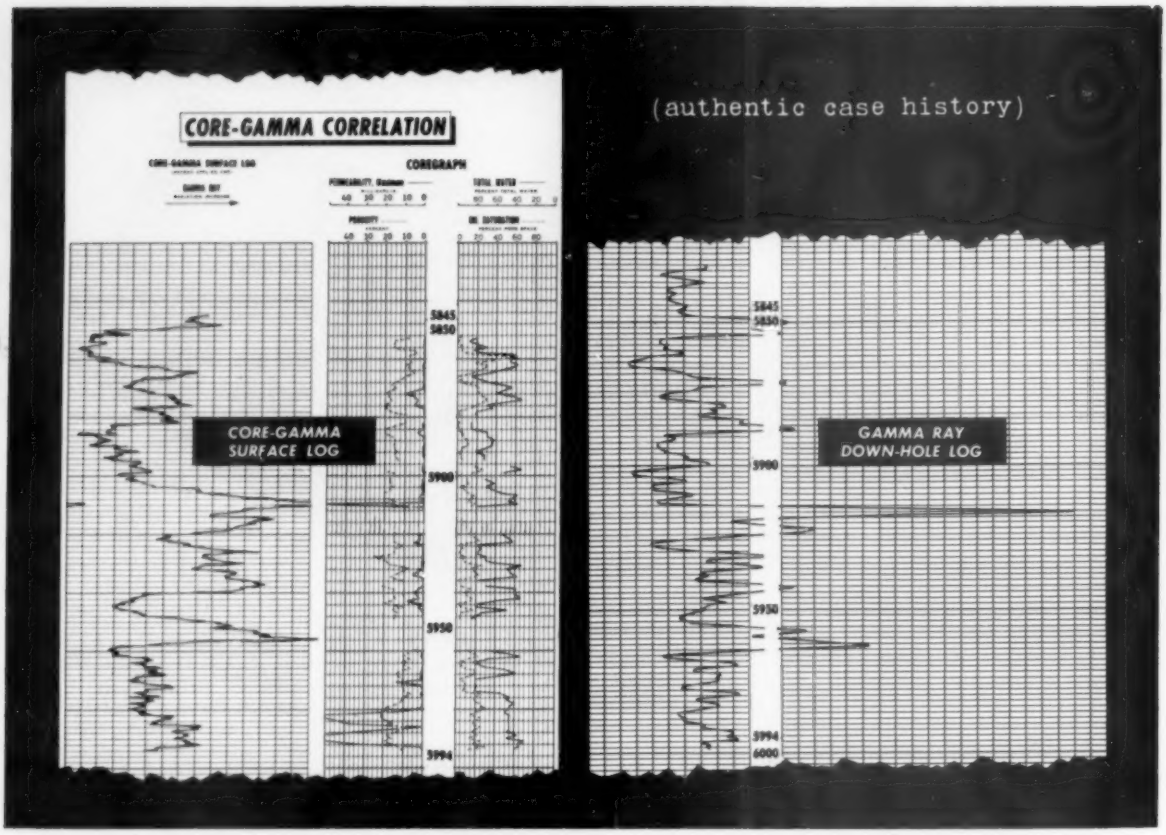

how to pinpoint a pay zone . . .

(Excerpts from informal field report)

"Glorietta Formation, Andrews County, Texas: Operator cored to 5942' and had us analyze samples. The lab results indicated some production . . . However, when compared to core analysis data on a nearby well it appeared doubtful that the desired pay section had been reached . . . We ran a Core-Gamma Surface Log and the operator compared it with down-hole gamma ray logs on adjacent wells . . . A good correlation indicated that another 52 feet should be cut, and the anticipated productive zone was found in the bottom 30 feet of this second core."

Unusual? Not at all! The Core Lab-developed method* of monitoring the gamma radioactivity of cores and comparing "surface" gamma ray logs with core analysis data and conventional gamma ray logs (from the same or adjacent wells) has opened up an entirely new concept of down-hole correlation.

The procedure is rapid, simple, and inexpensive. The applications are virtually limitless. Many operators are now requesting Core-Gamma Surface Logs on all core recovered.

Equipment for performing this new Core Lab service is installed in Midland, Lubbock, Pampa, Monahans, Hobbs, Farmington, Edmonton, Regina, and Calgary. Drop in and ask for a demonstration.

Core-Gamma Surface Log — another sign of leadership in the advancement of petroleum reservoir engineering.

*PATENTS APPLIED FOR

A sixteen-page brochure, describing the operation of Core-Gamma Surface Log equipment and outstanding case histories, is available for the asking. Address inquiry on your company letterhead to address below, attention Dept. S.D.

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Mideast Crisis Hits Key Oil Area

Western control of the Middle East's vast—and vital—oil reserves was visibly shaken this week. It was not lost. Nor necessarily threatened. But it was definitely shaken by the coup in Iraq which put pro-Nasser forces in power for the first time in one of the chief Middle East oil producing regions.

Earlier, President Gamal Abdel Nasser of the United Arab Republic had already achieved control over all westward transportation routes for Middle East oil. Since Egypt's union with Syria, Cairo has been sitting as stationmaster on nearly 3-million b/d of oil moving to Europe and other points West: 1.9-million b/d passing through the Suez Canal, plus 500,000 b/d from Iraq and 350,000 b/d from Saudi Arabia pumped through pipelines across Syria.

This was a precarious enough situation. But until now, Nasser's forces had not been in control of any of the huge sources of oil supply. With the coup in Iraq, the situation is changed drastically—with ominous overtones for the West.

Apart from Iran, which is non-Arab, there are only three giant oil producing areas in the Arab world: Iraq, Saudi Arabia, and Kuwait. These three produce about 3-million b/d, or more than Europe's entire consumption.

Production gives only a small clue to their significance. The three Arab states alone hold more than one-half of the entire free world's proven oil reserves—or at least 130-billion bbl. (60-billion bbl. in Kuwait, 45-billion bbl. in Saudi Arabia, and 25-billion bbl. in Iraq). This is nearly four times as much as the proved reserves of the U.S.

Published estimates of Middle East reserves are so ultra-conservative that even these figures are misleading. Probable reserves in these three states, already discovered but not fully "proven," may well total twice the published figures.

Because of the vastness of these oil reserves—unmatched in sheer size anywhere else on the globe—these three Arab states, plus Iran, represent the free world's indispensable "oil bank" for meeting the rapidly rising oil consumption needs of Europe, the Far East, Africa, and even parts of the Western Hemisphere.

The overthrow of the pro-West government in Iraq this week confronted the West with its gravest crisis in the crisis-strewn Middle East to date. It will have far-reaching implications because:

- **Iraq was considered the West's staunchest ally in the Arab Middle East.** It was, for instance, the sole Arab country to become a member of the Western-sponsored Baghdad pact (other members: Turkey, Iran, Pakistan, and Britain, with the U.S. acting as unofficial supporter). And its government has been consistently and unwaveringly pro-Western through all the turbulences in the Middle East in the past 20 years.

- **Iraq's government was considered the most strongly entrenched of the Arab states.** Strong-man Nuri es-Said had kept Iraq under firm control for nearly 40 years, from it's birth as a British mandate after World War I, through its independence in the 1930s, and the crisis of rising Pan-Arabism in the 40s and 50s.

The monarchy, under young Feisal II, had not been regarded as unpopular.

- **Iraq has the strongest economy in the Middle East.** Not only is it underpopulated in relation to its arable land potential, but wise investment of the country's oil revenues into a long-term development program featuring improved irrigation, flood control, transportation, and housing is already resulting in a visibly rising standard of living. It is one of the few Middle East countries in which hope for better conditions for the masses is a reality, not a mirage.

One of the most serious implications of the Iraq crisis may be its incendiary effect on the less-strongly-entrenched pro-West governments in Saudi Arabia and Kuwait—the two remaining key Arab oil-producing areas.

These governments are also confronted with strong pro-Nasser nationalist pressures, both from within and without. King Saud's army and bureaucracy are heavily infiltrated with pro-Nasser men, and at least one attempted coup has been uncovered.

The Saudi dynasty is already badly shaken. The King's transfer of sweeping powers to his brother, Crown Prince Feisal, has improved the situation somewhat. But Feisal's ailing health is causing concern, and there's speculation whether he will be strong enough to stand up against the forces of Nasserism.

The Sheikh of Kuwait similarly is faced with a rising pro-Nasser "Arab unity" clamor, even from some members of his own family, while his expanded educational facilities and governmental system are heavily staffed by Egyptians and Cairo-oriented Palestinians.

The effect of the Iraqi situation on Lebanon and Jordan, where the pro-Western governments are in a precarious position, is also bound to be substantial.

One thing seems certain: Control of the great Arab oil producing areas, even if only manipulated through separate, Cairo-oriented governments, would give Nasser his first opportunity to turning Arab oil to Arab political ends, as he has often put it.

Nasser has made clear in his book, "The Philosophy of the Revolution," that Arab nationalist aspirations could best be advanced through two great natural assets: strategic location and oil.

He has already nationalized the former, the Suez Canal. The latter—towhich he refers as "Arab oil"—is now for the first time within his grasp.

Exactly what this would mean to the Western oil concessions remains to be seen. But there is little doubt that Nasser, who has built his own popularity by defying the West and ousting one Western interest after another, would put the opportunity to use.

The chief bargaining point for the West is that it still holds the main markets—without which the oil has little financial value. On the other hand, the Arabs' readiness to "cut off their noses to spite your face" is not to be entirely discounted, particularly when it is entwined with the emotionalism of nationalism. And Moscow stands ever ready to brew trouble by goading the Arabs into any and every extreme position that might hurt the West.

Will Statehood Improve Oil's Position

Oil men are uncertain what effect statehood may have on oil operations in Alaska.

A representative of one company that has been active in Alaska for more than a year thinks a state government, run by Alaskans with a first-hand knowledge of Alaskan conditions, might create a more realistic atmosphere for oil operations.

A spokesman for another company with its sights trained on Alaskan prospects feels statehood will not have any immediate effect on the oil search.

Regardless of statehood, oil men face the prospect of paying more for Alaskan leases.

The recently approved Alaska leasing law increases rentals on federal public lands from 25¢ an acre to 50¢ an acre and raises royalty from 5% to 12½%. It brought both rental and royalty into line with those on federal lands in the states.

Exempted from the rental boost for the first year are applications that were pending for several million acres when leasing was frozen last May.

Processing of thousands of other applications filed subsequent to the freeze is expected to be resumed soon by the Interior Dept.

In addition, some 10-million acres of lands lying beneath inland lakes and streams will become available for leasing under the Federal Mineral Leasing Act for the first time.

An estimated 33-million acres of a possible 84-million acres believed favorable for oil development are presently blanketed by leases or lease applications. The major share of this acreage has been spoken for in the past year.

The leasing boom attracted majors and independent operators as well as speculators and a sprinkling of celebrities. The latter include such personages as Hollywood's Jimmy Stewart and Randolph Scott.

One of the hot areas is around Bristol Bay, where Great Basins Petroleum Co. and General Petroleum Corp. recently concluded an agreement paving the way for possible exploratory drilling.

General Petroleum took an exploration option on a 1-million-acre block assembled by Great Basins about 250 mi. southwest of the Kenai Peninsula, site of Richfield Oil Corp.'s year-old discovery.

Among others sharing interest with Great Basins in the block are Reserve Oil & Gas Co., Monterey Oil Co., and Ferguson & Bosworth.

GP presently is engaged in geological and geophysical work.

Among others with leases in the Bristol Bay, or Nushagak, area are Texaco (Alaska), Inc., Aztec Oil & Gas Co., and Champlin Oil & Refining Co.

Two of the hot leasing areas have been the Kuskokwim region and Kodiak Island, home of the famed Kodiak bear.

Among those identified with Kuskokwim leasing are Pan American Petroleum Corp., Empire State Oil Co., Sunray Mid-Continent Oil Co., the Snowden interests of Texas, Bristol Bay Oil Co., and Shell Oil Co.

The rush to Kodiak was accelerated after sediments on the island were identified as Tertiary—the same as found on the Kenai Peninsula.

Among individuals taking leases is LeRoy H. Hines, San Francisco consultant, who turned many of the big blocks on the Kenai Peninsula.

Other areas of oil interest are the Gulf Coastal belt, Cook Inlet basin, Alaska Peninsula, Koyukuk region, Porcupine area, and Copper River basin.

Nearly all accessible land is reportedly leased or under application in the Gulf Coastal belt, covering the Yakutat-Katalla-Yakataga area, and in the Cook Inlet basin, comprising the Kenai Peninsula and the area north of Anchorage.

Large landholders on the Kenai Peninsula prior to Richfield's discovery included Standard Oil Co. of California, Phillips Petroleum Co., Union Oil Co. of California and Ohio Oil Co., GP, Shell, Sunray Mid-Continent, and McGreghar Land Co.

Since the discovery, British-American Oil Producing Co., Seaboard Oil Co. (now Texaco-Seaboard, Inc.), and The Texas Co., among others, have acquired acreage.

Union-Ohio interests are said to be large landholders north of Anchorage.

An estimated 3-million acres are spoken for on the Alaska Peninsula, where the search for oil in Alaska started 60 years ago with the drilling of three tests on the Iniskin Peninsula.

Among those represented in the land picture are Shell and Humble Oil & Refining Co., El Paso Natural Gas Products Co., Western Natural Gas Co., and Richfield.

In the Koyukuk region, one of the largest land-holders is said to be the Benedum interests. Leases have been taken by Paul G. Benedum, Sr., Paul G. Benedum, Jr., and William L. Benedum, of Pittsburgh. Texota Oil

In Alaska?

Co. also holds acreage and at various times has been mentioned as a candidate to drill.

In excess of 3-million acres are estimated to be under lease or spoken for in the Porcupine area. H. L. Hunt, of Dallas, is listed as a large landholder. Others with acreage in the area include the Snowden group, R. C. Crowell, and Oceanic Oil Co.

The Copper River basin has been an active area for leasing. Prior to Richfield's discovery, an estimated 200,000 acres were covered by leases. Today more than 2-million acres are covered by leases or applications.

Attractions of the Copper River basin include the presence of marine sediments and oil and gas seeps, and accessibility by modern highway—the Glenn Highway, connecting Anchorage with the Alcan Highway and Fairbanks.

Among those holding leases are Aledo Oil Co., the Union-Ohio interests, and Western Gulf Oil Co.

Another area that may see a leasing boom this year is the Arctic slope.

Enactment of the Alaska submerged lands bill will open the way for the federal government to proceed with previously announced plans to make some 16,000 acres on the Gubik structure available for competitive bids and another 4-million acres in the Gubik area available for noncompetitive leases (PW—Nov.29'57,p26).

This area is the site of Naval Petroleum Reserve No. 4, which was prospected by the Navy from 1944 to 1953. The Navy drilled about 170,000 ft. of hole on 18 structures (36 wells, 45 corcholes). In the process, it uncovered the Umiat oil field, with reserves estimated at from 30- to 100-million bbl., and the Gubik gas field, with reserves estimated at from 370- to 900-billion cu. ft.

As a measure of field activity in Alaska this summer, more than 50 helicopters are in service with field parties.

Normal par for the course is one helicopter per party.

Among the companies reported to have parties in the field are Amerada Petroleum Corp., British-American, GP, Great Basins, Humble, Ohio Oil, Pan American, Richfield, Shell, Sinclair Oil Corp., Standard of California, Sunray Mid-Continent, Texaco (Alaska), Texaco-Seaboard, Union Oil, and Western Gulf.

Some of these companies are anything but newcomers to Alaska. Standard of California was the first major to drill in Alaska, sinking a 5,034-ft. dry hole at Pearl Creek Dome in 1923. General Petroleum drilled a 2,005-ft. failure at Yakataga in 1926. Union Oil participated with California Standard and Tidewater Oil Co. in drilling a Salmon Creek wildcat that was abandoned at 7,596 ft. in 1940.

Three wildcats are currently active on the drilling front.

In the Ninilchik area, southern Kenai Peninsula, Standard of California's No. 1 Deep Creek Unit, section 15-2s-13w, is logging at 13,705 ft. The wildcat, a joint-interest project with Richfield, is the deepest ever drilled in Alaska.

Coastal Drilling Co., Bakersfield, Calif., spudded the test on Mar. 19, 1958. The location is about 50 mi. southwest of Richfield's No. 1 Swanson River Unit, which was completed late in September, 1957, flowing 900 b/d of 33-gravity oil and 122,000 cu. ft. of gas per day through 1½-in. choke from 11,150-215 ft. A second well 2 mi. south later confirmed the discovery.

In the Widebay-Kanatak area, Alaska Peninsula, Humble's No. 1 Bear Creek Unit, section 36-29s-41w, is setting whipstock at 10,604 ft. to sidetrack a fish. Present depth of the hole is 10,867 ft.

Humble must drill three tests to earn half-interest in an approximately 289,000-acre spread held by Shell.

In the Susitna Flats area, north of Anchorage, Anchorage Gas & Oil Development Co. No. 3 Rosetta, section 21-18n-3w, is repairing equipment at 4,770 ft., after resuming last May.

Another wildcat is planned for the Yakutat area, and additional work is also in the offing on the Iniskin Peninsula.

Colorado Oil & Gas Co. plans to drill its third test on a block near Yakutat, where two previous tests racked up about 21,000 ft. of dry-hole footage. Both earlier projects are said to have encountered favorable marine sediment sections and also oil and gas shows. Colorado Oil & Gas reportedly has purchased the Haney & Williams contract rig that was shipped from Long Beach, Calif., for the first two tests.

The Yakutat area is southeast of Katalla, where Alaska's first successful well was completed in 1902. In 30 years, some 30 wells produced 154,000 bbl. of oil from depths up to 1,750 ft.

Iniskin Unit Operator, Inc., formed by Havenstrite Oil Co. and Associates, plans to deepen No. 1 Iniskin Unit on the Iniskin Peninsula from present depth of 9,747 ft. No date has been set yet for resumption of operations. The well was spudded in 1954.

One oil man predicts that ten wells will be drilled by various companies in the next year or two in the Copper River basin, Porcupine, and Koyukuk area.

H. Edward Wolf, president of Erie Natural Gas Co., Inc., in a special report to stockholders recently, said one test is scheduled in the Copper River basin, three in the Yukon-Koyukuk-Kateel River province, and six in the Porcupine-Kandik region.

Erie Natural Gas, whose principal operations are in the Erie (Pa.) and northeast Ohio regions, is a member of syndicates holding 461,000 acres under lease or in application for leases in six potential basins.

ALL SMILES over passage of the Alaska statehood law are (l. to r.): T. A. Zappa, Alaska Oil & Minerals Co. president; B. F. Heintzleman, former governor of Alaska; and Rep. Leo W. O'Brien (D., N.Y.) author of the bill in the House.

Europe's Small Nations Active in Oil

Of the smaller European countries, only Austria produces oil. Spain is considering a new 50-50 oil law that might spur exploration. Most of the other nations are growing in importance as consumers.

I. Austria

Austria's oil industry is deeply in the "red." With about 35% of its dropping production being hauled off to Russia as "compensatory" payment, Austria may soon have to import crude as well as products.

The country, Europe's second largest producer, is faced with declining production. It now produces about 63,000 b/d, with a decline to 55,000 b/d expected by the end of 1958. This compares to a peak of 73,000 b/d in 1955. Of its total production, 20,000 b/d must go to Russia until 1965.

Austria's decline is attributed to overproduction by the Russians when they took over the oil fields after World War II.

Certain products now have to be imported because local refineries are outdated and cannot supply them.

To meet an over-all demand of about 38,000 b/d, Austria has a capacity of 48,000 b/d, made up of 40,000 b/d of state-owned capacity, and about 8,000 b/d of private-owned.

The government is now building a 32,000 b/d plant at Schwechat. It may later be increased to 50,000 b/d. When the first stage of the plant comes on stream at the end of 1959, older plants will be retired as outdated and obsolete.

The government is favorably inclined—at least at present—toward foreign oil capital. It has called a halt to nationalization of its already semi-nationalized industry, and is busy implementing the Vienna Memorandum of 1955, under which Western oil companies are either getting back prewar holdings or being compensated.

Negotiations are now under way for the return of the 8,000 b/d Lobau refinery and pipeline to its prewar owners, Socony and Shell. Also open for settlement is the question of indemnification to Rohoelgewinnungs AG, owned by Shell and Socony, for concessions lost during World War II.

The main theme of operations for the oil business now is accelerated exploration. The government is interested in finding partners to speed things up.

British Petroleum has entered into a joint agreement with the state for exploration—first pact since a 1956 treaty restricted independent oil development by foreign oil companies (PW—Aug.9'57,p45).

II. Scandinavia

With competition for marketing outlets becoming increasingly stiff, more and more oil companies are taking a long, hard look at Scandinavia.

Some companies are expanding their present outlets, while others are deciding whether or not to plunge into the area. Petrofina, for one, has entered the Norwegian market. And in Finland, Socony reportedly plans to market gasoline.

In the meantime, Socony and Caltex have started building service stations in Norwegian areas where they had not previously operated.

There is no oil production in Scandinavia, except for some small shale oil output in Sweden.

Demand in Scandinavia is brisk: It has almost tripled since 1948, and is expected almost to double again by 1965. It climbed from 120,800 b/d in 1948 to 344,100 b/d in 1957. One major company estimates it will reach 435,340 b/d by 1960, and 568,200 b/d by 1965.

• **In Denmark, oil now supplies 48% of total energy, and it is expected to supply 58% by 1960.** State railways are switching to diesel engines, home oil heating is rapidly rising, and the use of oil by power plants is expected to jump sharply. By 1960, heavy fuel oil may represent 50% of total demand, compared with 42% in 1956.

• **Sweden's largest energy source is oil.** And a housing boom will further push demand for distillates, since almost all new homes will be oil heated. Heavy fuel oil consumption is high, and is slated to grow with increasing industrial activity and coal conversions. Oil companies, however, are hampered financially by the imposition of compulsory reserve stocks.

• **In Norway, hydropower provides about 65% of the energy, while oil supplies only 26% of the total. Oil demand, however, is expected to grow,** with heavy fuel oil showing big gains as car-import restrictions, poor roads, and heavy taxes limit gasoline demand.

• **Finland is passing through a difficult economic period.** The government is struggling to control inflation, unemployment, and outlays of scarce foreign currency. Therefore it has restricted oil import licenses to the amounts included in the trade pacts with Russia and Rumania.

A new 40,000 b/d refinery, planned by Esso for Norway's Oslo Fjord, will boost Scandinavian capacity to about 108,000 b/d. Existing capacity consists mainly of three small refineries in Sweden and the 18,000 b/d Neste Oy plant in Finland. The latter is now running only crude coming from Russian and Rumanian sources.

III. Switzerland

Tiny Switzerland—which doesn't have any crude production, refineries, or pipelines—hopes to have all three before long.

Some independents, including two U.S. firms—Rimrock Tidelands, of Shreveport, and D. D. Feldman, of Dallas — have exploration interests here, and a German independent, Gewerschaft Elwerath, is already drilling. In addition, two international majors, Jersey Standard and British Petroleum, are said to be looking the area over.

Oil company interest in exploration has prompted several cantons of the Swiss Federation to overhaul their individual concession laws, with an eye toward unifying requirements for grants. As it is now, it is difficult for a company to get a large concession that doesn't overlap a neighboring canton—with its own set of rules.

The Alpine nation's first refinery and pipeline are being planned by a privately owned Italo-Swiss investment company. The final decision is to be made by September on the company's plans to build the 20,000

b/d plant at Stabio, near the Italian border, and a 125-mi., 12- or 14-in. line to haul crude from the Italian port of Genoa (PW—Sept.13'57, p66).

Crude is expected to come from the Middle East, but no supply arrangements have yet been made.

These moves are being prompted by rapidly increasing demand, which has tripled since 1950 to about 54,500 b/d.

The hard-currency market of Switzerland has attracted so many marketers that one company official describes the situation as "a mess." Price wars are commonplace, and, with surpluses overflowing from neighboring Italy, there appears to be no relief in sight.

IV. Spain

"Wait till next year" is becoming the byword for U.S. oil companies interested in joining the oil hunt in Spain. By then, concession terms are expected to be more attractive.

A new oil bill, designed to stimulate foreign investment, has just been approved by the Cabinet. It is now being passed along to the Cortes, or parliament, for final approval. Chances for passage in November—or more probably by next January are reported good.

Several international oil companies say they might be interested in exploring under a more favorable law.

A proposed 50-50 oil law would permit companies to work in Spain with 100% foreign capital instead of the present 51% required Spanish participation.

Other terms include:

- A newcomer would be eligible for a maximum of 20 exploration grants of up to 98,800 acres each. These are convertible into development grants, with acreage reduced by 50%.
- All but 10% of the company's share of profits could be transferred out of Spain.

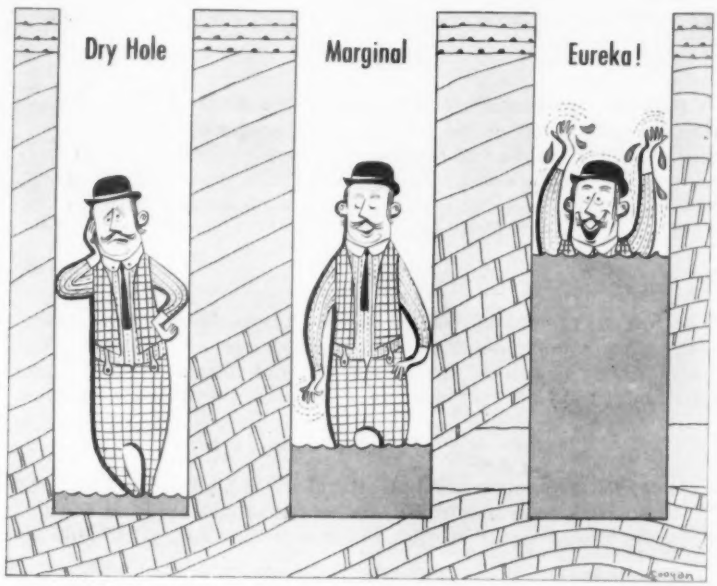
Although exploration is active, only minor shows of oil and gas have been found. One U.S. group is searching under an agreement with the government's National Institute of Industry (INI) that provides for 50-50 sharing of costs and profits. A company known as Valdebro runs the oil operations of the two.

The U.S. group is headed by General American Oil Co. of Texas, and includes DeGolyer & McNaughton, American Overseas Petroleum, Lion Oil, Delta Drilling, Murphy Corp., and others.

Two other companies exploring are the government's Campsa, and Ciepsa, which is associated with a German independent.

Increased interest in exploration is being spurred by a rapidly rising domestic demand, which has doubled since 1954 to about 74,000 b/d.

To meet its rising demand, Spain has a refining capacity of about 132,000 b/d, which may be expanded with a new 25,000 b/d plant.



Oil Had Its Problems in 1800

They had a method back around 1800 to measure oil productivity: If the seepage in a hole came up to a man's neck, it was a good producer. Down around the knees, no good.

That is how it was described in an early, early edition of the Encyclopedia Britannica. Recent research done in connection with a new book, "The Great E. B." (Encyclopedia Britannica), by Herman Kogan, uncovered this and other items on oil operations of long ago.

The 1800 edition of the reference book told of a man's visit to some wells in Asia during the days of the Burman Empire.

Production and transportation methods were on the elementary side, too, in those early days.

This is how the crude was brought to the surface:

"The oil is drawn up in an iron pot, fastened to a rope passed over a wooden cylinder. . . . When the pot is filled, two men take the rope and run down a declivity cut in the ground to a distance equivalent to the depth of the well.

"Thus, when they reach the end of their track, the pot is raised to its proper elevation. The contents —water and oil—are then discharged into a cistern, and the water is afterwards drawn off through a hole at the bottom."

The need for conservation cropped up quickly. The 1875 edition of the Britannica said there was reason to believe that the petroleum supply was ample for an indefinite period, but noted that "the present production of oil is every where wasteful at the extreme."

One trademark of the oil industry—the risk element—was soon apparent, too, along with government participation.

The 1800 report explains that the Asian government leased the land to "adventurers who dig wells at their own hazard, by which they sometimes gain, and often lose, as the cost is considerable."

Price was an early headache. The oil at those Asian wells was sold for a "mere trifle," the Britannica reported at the time.

What's New / IN THE INDUSTRY

The five states involved in the offshore lands dispute are finalizing their strategy for the showdown, now scheduled for mid-October before the U.S. Supreme Court. Attorney generals of Louisiana, Texas, Mississippi, Alabama, and Florida met this week at Baton Rouge to put the finishing touches on the brief they will file jointly in mid-August.

•

A California producers' group blames the "progressively deteriorating California oil industry" on the federal imports program. Richard R. Von Hagen, president of the Oil Producers Agency of California, said last week that the recently revised Pacific Coast Crude Quotas (PW—Jul.11 '58,p25) "so completely disregard actual conditions in the California oil industry as to be wholly meaningless."

•

The Navy, swamped by bids to drill its Teapot Dome development program, has a little less than 60 days to choose a contractor. The Office of Naval Petroleum Reserves got 31 bids for the project. Bids range from 1% to 33% of net profit, but other factors must be considered.

•

Oil's capital spending in the Free World hit $11-billion in 1957, up 12% from 1956, according to the Chase Manhattan Bank. The bank's 1957 report on oil says that Free World reserves totalled 215-million bbl. at year's end, and that 1957 Free World demand averaged 16-million b/d.

•

Michigan's oil industry is the latest to consolidate its governmental and public relations agencies. It has merged the Michigan Petroleum Industries Committee and the Oil Information Committee to form the Michigan Petroleum Institute. Like similar groups already formed in Connecticut and Nebraska, MPI will work with the newly formed API Committee on Public Affairs.

•

Ashton Mouton is the new Louisiana Conservation Commissioner, replacing John B. Hussey, who was named to the Federal Power Commission recently. Mouton, former mayor of Lafayette, La., conducted his first hearings as commissioner this week.

•

The first crude from Indonesia's newest field was loaded this week at Caltex's new ocean terminal at Dumai, Central Sumatra. The export terminal opens up the Duri field, which will boost Caltex's Indonesian output by about 25,000 b/d, to 175,000 b/d.

•

Eastern States Petroleum & Chemical Corp. has filed an appeal of the district court decision upholding the voluntary imports program, as expected. The appeal is designed to win an injunction to halt the plan.

•

Ashland Oil & Refining Co. is expanding again by buying the Ohio solvents and chemical marketing system of Anderson-Prichard Oil Corp. The system distributes products at Cincinnati, Dayton, Cleveland, Columbus, and Bellaire, Ohio, and at Indianapolis, Ind.

INSIDE *Slant*

THINK THESE OVER

Almost from its inception, the American Assn. of Petroleum Landmen has been carrying on an enlightening weekly campaign citing pertinent facts about the petroleum industry.

Among the latest bits of timely information are these interesting facts:

Gasoline sells for 31¢ per gal.

Milk sells for $1 per gal.

A cow gives milk.

Risk capital must find oil.

Another version is this one:

Gasoline sells for 31¢ per gal.

Distilled water sells for 40¢ per gal.

Water, water, water everywhere!

Risk capital must hunt for oil.

And if you need another, here's one that's really stimulating:

Crude oil sells for 7½¢ per gal.

Risk capital must find it!

Beer sells for $1.20 per gal.

Unlike oil, you can make it!

And to take the campaign down to the landowner level, the association had this to say:

Last year the oil industry paid out to property owners, including farmers, over $8-billion in royalties, rentals, and bonuses.

LeRoy Menzing
EDITOR

THE MAN IN THE RED CAR WORKS FOR YOU

but he's not on your payroll

Your Tretolite field service engineer is on call 24 hours a day—to keep your oil treating program on the most efficient basis possible. He is always available to help you with your corrosion, scale, paraffin and secondary recovery problems, too. It's his job to help you increase profits by cutting production costs—and every day, wherever oil is produced, he's doing just that.

Are Tretolite Company products and services helping you to cut production costs? To give them a chance, just . . .

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TF-58-3

Looking Ahead in Washington

McGraw-Hill
Washington
Bureau
July 18, 1958

The Trade Bill probably will end up with a compromise on import controls. Mandatory controls—demanded by producers—aren't expected. But the Senate is expected to tighten the national security provision, providing stricter guides on import regulation than desired by the Administration. In effect, it would give domestic producers wider grounds to appeal for import limitations under "threats" to national security.

A House-Senate conference on the Trade Bill is a certainty. One major area of disagreement probably will be on the duration of the bill. The House version calls for a five-year extension. The Senate may prefer its committee's bill that provides for only three years. A four-year compromise is a possibility.

•

Watch for the decontrol of some petroleum products now banned for export to communist countries. Currently, all crude and product exports are controlled by the government under the so-called Battle Act. Exporters are barred from doing business with communist-bloc nations. But it is now known that the list is being revised—and several petroleum products are due to be freed. You can expect this action in a month or two.

•

Eisenhower's visit to Canada won't result in any immediate oil or gas policy changes. For several years, a joint U.S.-Canadian cabinet-level group has been ironing out trade problems between the two countries. And the U.S. oil import actions, for example, came only after a close study of Canada's position as an exporter to the U.S. The Presidential trip to Ottawa did not change the situation, and, until Canada presents some new arguments, U.S. petroleum policies affecting Canada won't be revised.

Canadian subsidiaries of U.S. companies, however, now have an opening for trade with Red China. Until now, the U.S. has been holding domestic companies responsible for the trade activity of their foreign-based subsidiaries. Exports to communist China by such Canadian firms now will be considered by the State Dept. on a case-by-case basis, taking account of the importance of the imposed trade to the Canadian economy. Some Canadian oil companies owned by U.S. interests may be affected.

•

The government may have a problem with water supply in Colorado's oil shale area. The Upper Colorado River project will be dedicated to other uses, and the shale area may not get some needed water. The water shortage is causing second thoughts in the Interior Dept., which is considering reopening the government shale plant at Rifle, Colo.

•

The State Dept. is beginning to doubt chances of any quick, new Argentine oil policy. Argentina's President Arturo Frondizi apparently is having difficulty finding a formula that will lure foreign oil companies into the country and, at the same time, satisfy his nationalist critics.

U.S. oil companies are also concerned about foreign depletion in any Argentine venture. In order to qualify under depletion provisions, companies need an economic interest in the oil produced. Contractual arrangements in Argentina might cause loss of this tax treatment in the U.S.

Dallas Firm Claims World's Deepest Slim-Hole Pumper

The world's deepest slim-hole pumper — a 5,000-foot oiler in Cochran County's Buckshot field —was reported completed Monday by Stekoll Petroleum Company, Dallas.

The well, Stekoll No. 1 J. W. Frost, 7-W-PSL, eight miles south of Bledsoe, gauged 139.8 barrels of oil plus 75 barrels of water a day on pump from around 5,140 feet. Slim hole wells produce through 1-inch hollow rods set in 2½-inch casing as opposed to normal casing size of 5½ inches.

M. H. Stekoll, president of the firm, said economy is the primary motive behind the slim well procedure. Savings from such techniques have reached as much as one-half normal costs in shallow depths and one-third in others, Stekoll claimed.

Since 1942, when he began water flooding work in the Bolton field near Independence, Kan., Stekoll has pioneered slim hole production.

Reproduced from the Dallas Morning News

and it is being pumped with a

JOHNSTON *Hydraulic* PUMPING UNIT

Yes—from Mexico to Canada, the Johnston Hydraulic Pumping Units are proving the answer to the demand for "low cost pumping".

Not only does a Johnston Unit cost less initially but it costs less to install and maintain—and it is easy to move from well to well.

Many deep wells with moderate production can be profitably pumped only with a Johnston Hydraulic Unit.

Sizes range from 2 ft. stroke to 12 ft. stroke.

"I chose the Johnston Hydraulic Pumping Unit because of its lower initial cost—and its long, slow stroke protects the 1-inch hollow rods".

M. H. Stekoll

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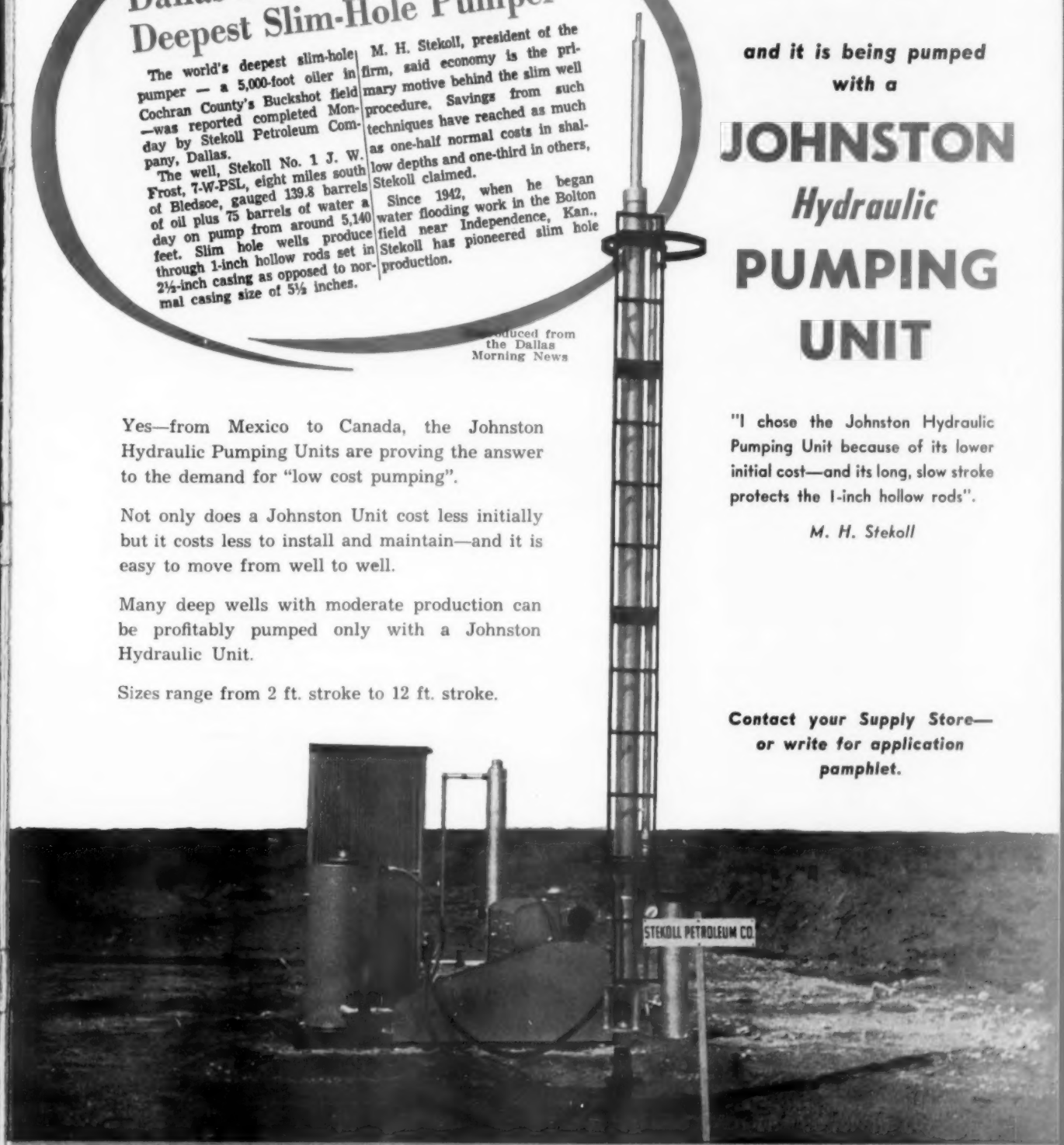

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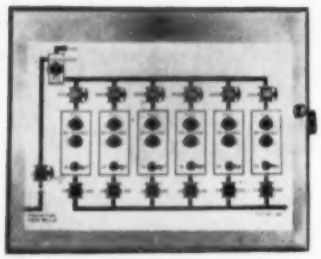
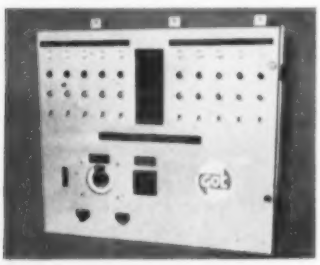


ELECTRIC TANK SWITCHING PANEL
Sizes for two to 10-tank batteries. Supplied also for pneumatic operation.



ELECTRIC TEST PROGRAMMER
Furnished in types that permit individually selective or identical test periods for up to 32 wells, with provisions for manual test of any well at any time. Available also for pneumatic control.

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Continuously evaluates the quality of fluid being delivered. Automatically re-route flow for additional treatment when excessive BS&W is present.

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TYPE "TPO"
Low pressure, three-way, two position—center position open. Supplied also in Type "CPO-2" for high pressure service.

TYPE "DC-TS"
Tapered disk pressure regulating valve with soft seat. Furnished also in Type "DA-TS", direct-acting.

TYPE "CPC"
Three-way, three-position, center position closed.

TYPE "DCB-1"
Pressure balanced, soft seat. Sizes, 2" to 3", for working pressures to 10,000 psi. Supplied also in direct-acting Type "DAB-3".

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In addition to all necessary basic controls, Garrett has a complete line of auxiliary components. These include Fluid Meters, Flow No-Flow Indicators, Wellhead Safety Valves and all other required *and desired* controls.

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To assist in system design and to free you of the bother and expense of co-ordinating components into a workable system, Garrett offers a complete "turnkey service." This assures you of the services of the most competent engineers in the field of lease automation and custody transfer—permits you to buy a "packaged system," installed and in operation, at a quoted cost. Inquire about these services and about GOT Automation today. Ask your GOT representative or write to the Lease Automation Division, Garrett Oil Tools, Inc., P. O. Box 2427, Longview, Texas

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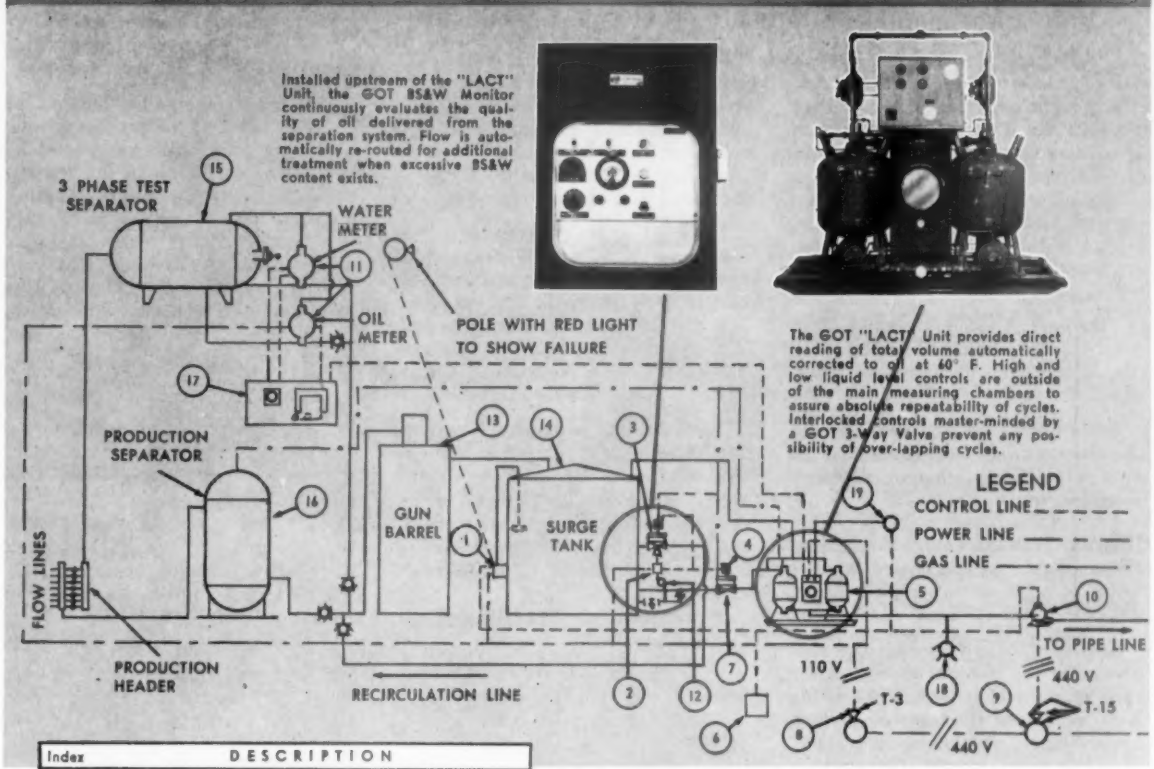
THIS GOT "LACT" SYSTEM IS SAVING MONEY ON A SOUTH TEXAS LEASE


Installed upstream of the "LACT" Unit, the GOT BS&W Monitor continuously evaluates the quality of oil delivered from the separation system. Flow is automatically re-routed for additional treatment when excessive BS&W content exists.
3 PHASE TEST SEPARATOR
WATER METER
OIL METER
POLE WITH RED LIGHT TO SHOW FAILURE
PRODUCTION SEPARATOR
GUN BARREL
SURGE TANK
FLOW LINES
PRODUCTION HEADER
RECIRCULATION LINE
The GOT "LACT" Unit provides direct reading of total volume automatically corrected to oil at 60° F. High and low liquid level controls are outside of the main measuring chambers to assure absolute repeatability of cycles. Interlocked controls master-minded by a GOT 3-Way Valve prevent any possibility of over-lapping cycles.
LEGEND
CONTROL LINE
POWER LINE
GAS LINE
TO PIPE LINE
110 V
440 V
T-3
T-15
440 V

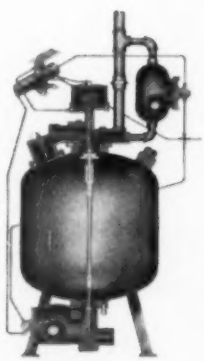
Index	DESCRIPTION
1	VAREC TANK GAUGE W/3 LIMIT SWITCHES
2	GOT B. S. & W. CUT MONITOR
3	GOT 2" TYPE "TPO" DIAPHRAGM MOTOR VALVE
4	SOLENOID PILOT VALVE
5	GOT LACT—2 METERING UNIT (W/BUILT IN CHECK UNIT)
6	GOT SURGE TANK PUMP CONTROL PANEL
7	GOT 2" TYPE TA DIAPHRAGM MOTOR VALVE
8	TRANSFORMER 440V—110V (FURNISHED BY REA)
9	TRANSFORMER 12000V-440V (FURNISHED BY REA)
10	PIPE LINE PUMP
11	1 BBL. DUMP METERS
12	MONITOR CIRCULATING PUMP
13	GUN BARREL 8' x 24' ¼" x ¼" x ¼" 220 BBL.
14	SURGE TANK 400 BBL. CONE BOTTOM ⅛" x ⅛" x ¼"
15	3 PHASE SEPARATOR 30" x 10'
16	PRODUCTION SEPARATOR
17	OPERATIONS RECORDER & TEST TIMER
18	LINE SAMPLER
19	MONTHLY ALLOWABLE LIMIT SWITCH

Heart of this system is a GOT "LACT" Unit that provides continuous delivery of accurately metered fluid. Total volume is recorded on a mechanical counter after automatic temperature compensation. This unit has been proved in the field to be more accurate than manual gaging. It has been approved by the State regulatory body, and is accepted by most gathering systems and transmission companies.

To assure pipeline-quality oil, all production is scanned by a GOT BS&W Monitor . . . another indispensable GOT contribution to workable automatic custody transfer.

Like this major company*, you too can save money with GOT Automatic Custody Transfer. More experience . . . more field-proved components . . . more systems in actual operation . . . these assure you of the utmost in accuracy, dependability and economy. Write today for details.

*Name furnished upon request. Inspection of system can be arranged.



The GOT Type "A-3" Fluid Meter is for use where automatic gaging alone is desired, and for automatic custody transfer where continuous delivery is not required. Fluid cannot enter high level control until main chamber is completely full, after which the exact volume within the chamber is isolated by the upper valve. Low level is actuated only after chamber has emptied completely. With interlocked controls actuated by a GOT 3-Way Valve, this design assures absolute repeatability of metering cycles.

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Texas Fireflood Solves Some Problems

An experimental project in East Texas—in operation only a few months—is already providing some answers on the benefits of thermal recovery.

A pilot in-situ combustion project in East Texas is already showing signs of success after only a few months of operation.

Southworth & Wood, Houston independent, is conducting the 10-acre project in the Camp Hill field, 9 mi. southeast of Palestine, Anderson County (map, page 24).

The project is on a faulted, anticlinal-type structure containing Wilcox-Carrizo sands at an average depth of 420 ft.

Some strong indications, if not complete answers, which may have an application in any thermal recovery program, are beginning to show up.

J. A. Perkins and J. W. Quinn, Houston petroleum engineering consultants who are implementing the technical phase of the project, already are fairly sure of some conclusions:

One of the key factors in the economics of the thermal process is the type of residual left when the crude is driven out of the reservoir at high temperatures. They say:

At the pilot project, the crude is naphthenic-base, 18.8-gravity oil, very viscous, with a low pour point. With a low wax and sulfur content, the crude is termed ideally suited for refining into lube oils and high-octane gasoline.

Say Perkins and Quinn: "The residual is what you burn to keep the process going. You must have enough residual left to burn, and the residual must contribute enough heat to keep the burn going.

"For example, the process won't work on condensate because there would be no residual left.

"And too much residual left, percentage-wise, would put you out of business, because you'd be burning up too much of the crude in place.

"The quality of the crude is all-important to the feasibility of the process, and the crude in each reservoir must be analyzed for its heat application."

As the thermal recovery progresses, the type of crude coming out of the reservoir will vary.

Say engineers: "You shoot your laws of permeability all to hell, so what you're working with isn't like anything you analyze in the lab."

Production at Camp Hill will be, first, native crude; then crude plus lighter ends; and, finally, residual hydrocarbons and some connate water (boiled off as steam, pushed ahead of the heat front, and recondensed).

The heat doesn't dissipate out of the formation, apparently, because the earth acts as an insulator, and the heat remains where the fuel—residual—is. While similar to a burning coal bed, the process is more complicated because the crude moves as it is heated, and changes its character.

Recovery, say engineers, is a function of air input. "You put in so many cubic feet of air and get out so many barrels of oil. But the amount of air depends on the nature of the reservoir and of the crude, and the amount of air won't be identical for all reservoirs."

"As a broad guess," say Perkins and Quinn, "it would require about 7,500 to 10,000 cu. ft. of injected air for each barrel of crude produced, up to the economic limit—on a reservoir, not pilot project, basis."

Each reservoir, say Perkins and Quinn, will have its own peculiarities, which will govern how heat behaves.

Project engineers think there's no question but that the process is valid—although the application must be suited to the conditions. But the applications may be more extensive, they say, than many now think.

"Eventually," say Perkins and Quinn, "there is no question but that this will be a legitimate process. Like others, there will be some applications that are extremely profitable and others that will be flops.

"By comparison, we believe that this process—where it is good—will be quite a bit more profitable than a comparable waterflood. We think the recoveries will be higher, but we don't know that yet.

"The process is especially applicable to reservoirs with low-viscosity crude due to low reservoir temperatures—not necessarily due to the nature of the crude."

For wider applications, they point out that underground crude "cracking" occurs. "This process," they say,

AIR INJECTION: Super-heated air is sent underground through this injection well at Southworth & Wood's pilot fireflood in Texas. Large vessel is the heat booster.

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Only three feet long, the Model "E" Retrievable Casing Packer has the same rocker-type slips and proven dependable packing element used so successfully on BAKER retrievable squeeze tools. No drag springs to make a long, cumbersome tool. No slip tie-links or guide grooves to allow the slips to become stuck or cocked. No restricted bore to prevent running instruments through the packer.

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"may have applications in areas now being waterflooded. It hasn't been determined yet that this thing is limited to just heavy oil, by any means.

"If temperatures are run up to those generated by burning oil, it makes some sections of the pay effective that were previously ineffective, and it's bound to drive out more hydrocarbons that are trapped there than any other method.

"You heat the closed pore space, crack it open, and drive the oil out of it—it just cooks it out. It's a side benefit, making more pore space effective.

"As of now, the amount of oil estimated to be in place is calculated, generally, on the amount of effective pore space that exists at the time.

"If you can increase the amount of effective pore space, you could make some 100-million-bbl. oil fields."

Already, the pilot project has established that combustion is taking place, and that the heat front is progressing.

At the project, the formation averages about 32 ft. of saturated sands, according to core drilling indications. The character of the viscous crude had previously defined commercial production.

Recently, an observation-production well was drilled 50 ft. away from the injection well in order to check the status of combustion, the effect on the crude and the formation, and the pattern of the heat flood.

Immediately after completion, the well flowed oil for 12 hours, then went to gas—not oilfield gas, but nitrogen and other gases, left after oxygen is removed from the air.

The observation well heated up so much that it was shut down temporarily for fear the high temperatures would ruin the equipment.

A thermistor was run into the well, and a temperature profile was made of the hole, with particular attention paid to the 35 ft. or so of reservoir sand face. The well was then flowed again, with the thermistor run up and down the well to check on the influx of flow.

It was determined that the highest amount of flow was coming through the most permeable portions of the sand section, the "preferential" channels.

The well was again flowed, producing at the rate of 35 to 40 b/d of oil, but was again shut down for fear of the effect of excessive heat on the equipment. The temperatures exceeded the measuring capacity of the thermistor.

A thermocouple was installed opposite the sand face in the well, and an assembly was rigged up to permit

water circulation in the tubing-casing annulus as a safety device.

Because of the behavior of the observation well, Perkins and Quinn believe that, "beyond any question," combustion is taking place, and the heat front is progressing. But it was still uncertain at last reports just how far out from the injection well it had gone.

It was discovered that the burn is following the "preferential" portions of the pay initially. But it appears that the rate of burning will slow down in these channels, permitting the burning in the less-permeable streaks to catch up. Therefore, the initial "fingering" progress of the front will become a fairly uniform progression, over-all. The front, say Perkins and Quinn, apparently will push out in a cylindrical form. If there is tapering, it looks as if it will be in a vertical, conical manner.

Combustion at this project was obtained without the use of any type of flame or mechanical heating device. It was done with the application of superheated air to the crude.

While not disclosing the actual operating temperature, Perkins and Quinn say that "it was high enough to ignite the crude."

The firm has worked out a method of handling variables that occur when air is superheated. The principle, they say, is simple: "Whenever you have oil that will burn, oxygen, and sufficient heat for combustion, combustion will occur."

Although the subject is somewhat controversial, Perkins and Quinn point out that some authorities believe that residuals can be set afire at temperaturers as low as 300F, and temperatures of about 700F should ignite the residual of 98% of the known crudes.

Another striking factor is the amount of air the injection well is taking—nearly 1-million cu. ft. daily. After combustion occurred, the heat-

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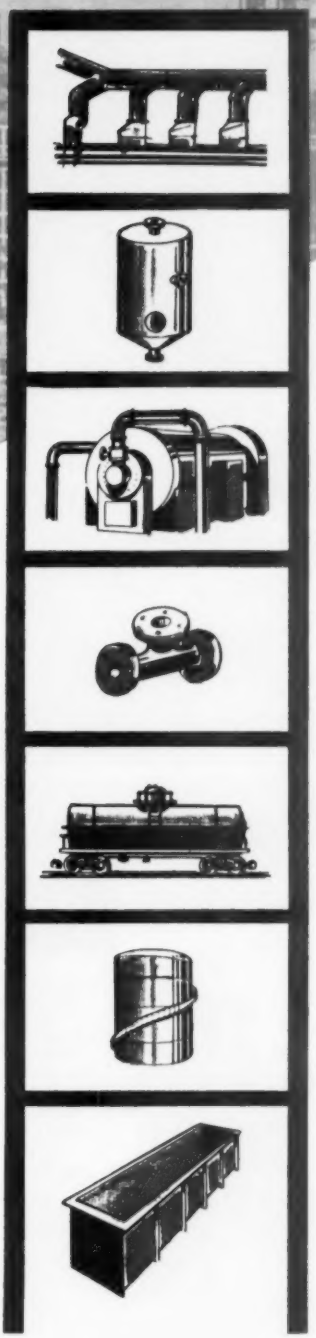

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Positive protection is assured through the use of rubber, plastic or metallic coatings and linings. Basically, each Atlas job is a custom job, performed either in the field or in Atlas' own shops. In addition, Atlas Metal Protection provides pickling, metallizing, sandblasting and other related services.

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booster was turned off, and air was injected without additional heating.

Injection was started slowly, with the rate gradually boosted to as much as 975,000 cu. ft. per day. The rate is now 950,000 cu. ft. per day.

Originally, injection pressure was 300 psi. Now it is running about 225 to 230 psi.

If there were no combustion, the engineers point out, there should be a stabilized injection rate at a constant pressure, since the air no longer is being superheated. Instead, the same volume is going in at a steadily decreasing pressure.

"As the oil warms up, the air can travel through it and the sand more easily," say Perkins and Quinn. "But the pressure will increase again as we fill up the reservoir with air. There might even be a reservoir back pressure later."

Actual injection began in April, and ignition of the crude took place within three weeks. At that time, the first results began to show at the output wells.

The program, which included coring operations, drilling of test wells, and the assembling and installation of compression equipment, started in July, 1957. The injection of air started Apr. 5.

To date, a total of eight wells have been drilled on the 10-acre site—the injection well, five producing wells, an experimental and production well, and the observation-production well.

The first encouraging sign was a flow of 2 to 3 b/d of oil per well. "All of the production wells have responded at one time or another," say Perkins and Quinn.

Another indication was the rise of carbon dioxide production from zero to "a substantial percentage of produced gas" in the output wells.

"All of the output wells either are producing or are showing evidence of communication," the engineers say. "There is some kind of response in all of them."

Full benefit of the ignition is yet to be obtained, however.

For one thing, bottomhole pressure hasn't yet built up.

Flowing production averages 7 to 8 b/d per well—about double the rate of a pumping well in the field, but not really commercial.

Say Perkins and Quinn: "We don't feel that we have got heat over to our producing wells yet. It's strictly air slipping through and dragging a little oil with it.

"We think that we have the energy distributed reasonably well. Now we're waiting for the thing to heat up. Then we might know."

The production-injection setup is basically simple, but there are some items of equipment not usually seen on a production site, and some special wrinkles in the use of conventional equipment.

The Wilson Supply Co. compressor is rated at 1-million cu. ft. of air per day at 300 psi. Since there is no aftercooler, all the heat caused by compression is utilized.

The hot air moves through 2-in. insulated lines to a Petro-Chem heat exchanger, where the temperature is boosted further. The air is then pushed through a 1-in. special alloy pipe, surrounded by industrial piping insulation, into the 450-ft. injection well. This 1-in. pipe continues down into the well, acting as the injection tubing string.

Four of the production wells are arranged in roughly a 5-spot pattern around the injection well, with the four corner wells 660 ft. apart. The fifth producing well is inside the square.

The production wells are gravel-packed and fitted with liners in the pay zone, but any wells completed in the formation's unconsolidated sand would be equipped the same way.

Some things, however, are different. The 11¾-in. casing in the injection well is perforated in the pay zone.

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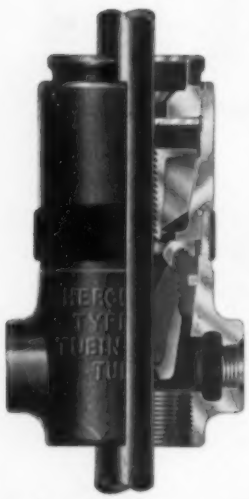
HERCULES TUBING HEADS

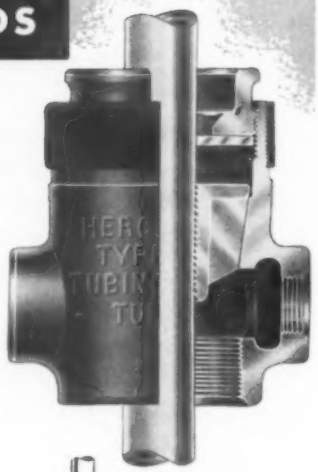


"TYPE J-5" TUBING HEAD

Ideal for flowing or pumping wells or for well servicing and repressuring projects. Will suspend 2" tubing to 5½" casing up to maximum of 180,000 pounds. Head is full-opening; constructed of pressure cast steel tested to over 4,000 psi. HERCULES original overhead packing arrangement and hinged slips facilitate installation and servicing. HERCULES Neoprene Tubing Stripper (2" - 2½" - 3") may be used in this head on wells flowing intermittently or to wipe tubing. Equipped with safety threads.

"TYPE J-5-S" STRIPPER TUBING HEAD

The dual purpose "Type J-5-S" Stripper Tubing Head is basically a "Type J-5" Tubing Head with a bowl (top section) screwed into the packing nut thread. The hinged slips, packing and packing nut are installed in the bowl (top section) with the tubing stripper in the body (lower section), thus permitting tubing to be run-in or removed under pressure. Test pressure is the same as the "Type J-5" Tubing Head.



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CITIES SERVICE

The 1-in. tubing through which the air is injected is suspended close to the top of the pay section. (The well is drilled right through the section.)

A Wheelco thermostatic control maintains a constant temperature for the air being injected. A thermocouple at the bottom of the injection well is tied in with cromel-alumel leads to a Wheelco indicating pyrometer at the surface, to keep a continuous reading of the bottomhole temperature.

The project—designed purely on a pilot scale—could be expanded into a full-scale thermal recovery program. This project, unlike many others, is primary in nature, rather than secondary.

"This is a test pattern," say Perkins and Quinn. "If it is completely successful, major development will occur.

"This location was selected because we felt it was very suitable. The reservoir required two things—the reduction of viscosity, and the implementation of energy.

"That, basically, is what we are trying to achieve in this test pattern.

"The Camp Hill application really is primary recovery, because it hasn't been feasible to produce the crude in place commercially by conventional methods. In one way, it is a secondary tool that is being applied here as a primary production tool."

The response, so far, is not the real payoff. That date can't be fixed yet, and there are a lot of answers yet to be found.

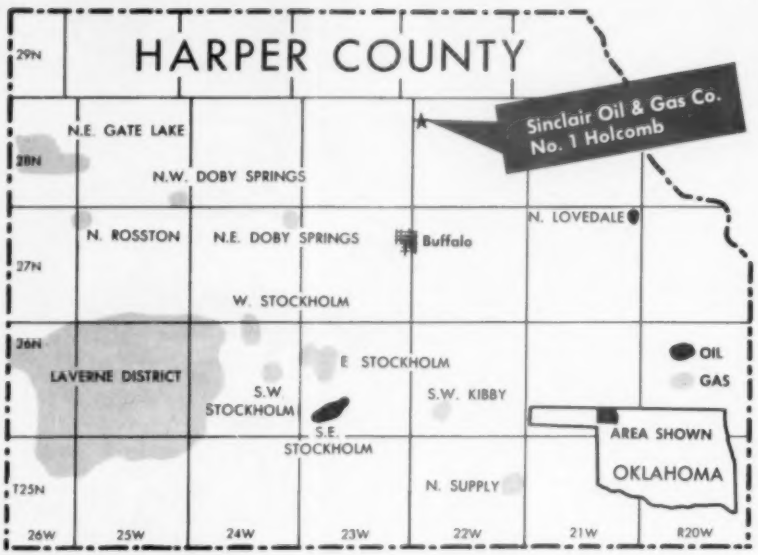
But any doubts that the project is economical are beginning to dissolve—although it is not yet possible to decide just how profitable the program will be. However, there is a possibility that fairly conclusive data will be available for estimation purposes within a month or so.

The interrelationship of the various criteria that promise a successful in-situ combustion program are still being worked out—the nature of the oil, its chemical composition, its reaction to burning, the products liberated, the action required to burn the crude, the physical characteristics of the reservoir that affect the economics of recovering the products of combustion, and the amount of carbon, hydrogen, and connate water present.

It is not yet certain, either, that the amount of compression being applied is enough—a reliable yardstick doesn't yet exist.

The pilot project is expected to produce a total of about 100 to 150 b/d of crude from the output wells.

"We can't pinpoint the date of optimum response," say Perkins and Quinn. "It might be 60 days or six months or a year and a half."



Oklahoma's New Arbuckle Pay

A new Arbuckle lime oil discovery in Harper County is furnishing a bright incentive for exploratory drilling in this section of northwestern Oklahoma.

Finding of the Arbuckle (Lower Ordovician) gives a big shot in the arm to the production future of that part of the state, where present production comes primarily from Pennsylvanian and Mississippian horizons.

The discovery—Sinclair Oil & Gas Co. No. 1 Holcomb—found Arbuckle oil at 7,664-717 ft. in an area where drilling so far has found mostly gas production at much shallower depths.

The well, in section 7-28n-22w, was completed flowing 314 b/d of 48-gravity oil through 30/64-in. choke and perforations, with 227,000 cu. ft. of gas per day.

The wildcat is 7 mi. north of Buffalo, the Harper County seat.

Sinclair drilled the wildcat on a farmout arrangement with Superior Oil Co. of California. Carter Oil Co. and Gulf Oil Corp. supported the test with acreage contributions. Sinclair added to its lease holdings in the area following the discovery at No. 1 Holcomb, increasing them from 4,800 acres to about 8,000 acres.

No. 1 Holcomb also aroused interest by picking up six other pay zones on the way down to the Arbuckle.

The Lovell (Pennsylvanian) showed gas and returned 60 ft. of gas-cut mud on drillstem test at 4,465-510 ft.

A drillstem test in the Lansing (Pennsylvanian) at 4,585-630 ft. flowed gas in one minute at a maximum rate of 9.7-million cu. ft. per day, and showed a spray of condensate as well.

A test of the Oswego lime at 5,360-405 ft. showed gas in one minute, and recovered 90 ft. of mud-cut oil and 110 ft. of heavily oil- and gas-cut mud.

The Chester section of the Mississippian was tested at 5,933-78 ft. to flow 240,000 cu. ft. of gas per day, with a recovery of 35 ft. of gas-cut mud.

The Viola (Upper Ordovician) at 7,265-78 ft. showed gas in one minute, flowing at the rate of 1.6-million cu. ft. per day, and recovering 30 ft. of 60-gravity distillate and 5 ft. of gas- and distillate-cut mud.

In addition, there was a fair gas show in the Basal Kansas City (Pennsylvanian).

Development is already under way, with an offset to No. 1 Holcomb now being drilled.

Development drilling will be carried out on a gas-spacing basis at present—that is, on 640-acre locations. Direct offsets to the oil discovery will come later. Sinclair No. 1 Kuhn has been started in section 6-28n-22w, north of the discovery.

A wildcat currently being drilled 3 mi. northeast of Sinclair's discovery might supply part of the long-range answer to the extent of the Arbuckle pay. Hamilton Bros., Ltd., is drilling No. 1 Vierheller in section 3-28n-22w, on another Superior farmout.

Not only does No. 1 Holcomb open up the northern part of Harper County to oil exploration, but it puts the spotlight on a possible Arbuckle

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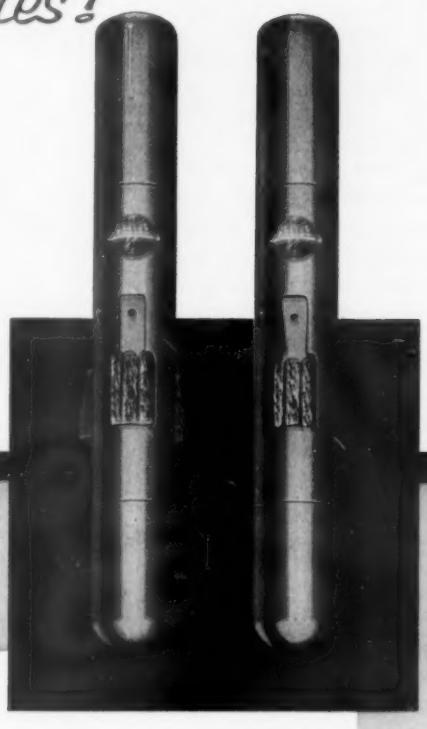
*Patents pending.



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- One tool (two trips in the hole) milled 95 feet of 7", 20 lb., J-55 casing, plus two collars, in 21 hours, 15 minutes.
- One tool (5 trips in the hole), milled 184 feet of 7", 23 lb., J-55 casing, plus 4 collars, in 77 hours, 24 minutes.

Actual Job Records sent on request

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POURING CONCRETE—A Sikorsky S-58 prepares to pour a 2700-lb. load of ready-mixed concrete for tower footings for a high-voltage line in California. The S-58 saved time and costly road building by also flying steel towers into position at the inaccessible sites.

Photo: *The British Petroleum Co., Ltd.*

JUNGLE DUTY—In remote areas Sikorskys offer unmatched versatility in serving many vital operations. In New Guinea, for example, 3 S-58s speed the search for oil by transporting drilling rigs, workmen, and all equipment and supplies.

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trend extending up into Kansas. Closest Arbuckle production now is some 31 mi. northeast.

The nearest Arbuckle production is in the Yellowstone field, Woods County, Okla., adjacent to the Kansas line. Other Arbuckle production lies farther north, in Kansas, above the Hugoton gas area. Current "trend" thinking puts the choice acreage directly north of No. 1 Holcomb, on into Kansas, only 5 mi. from the discovery.

Nearest oil production of any sort —and not much has been found in Harper County to date—lies 13 mi. southeast, in the North Lovedale field.

This field was recently revived by Hamilton Bros., Ltd., No. 1 Dies, which found production in the Oswego at 5,434-44 ft. Nearest production of any sort is a gas pay found in the Northeast Doby Springs field, 8 mi. southwest of Sinclair's strike.

Los Angeles Leasing Attacked

Oil leasing practices of the city of Los Angeles have drawn a scathing denunciation from a state legislative subcommittee.

Alleged faults in the city's leasing practices were outlined in a letter to Mayor Norris Poulson and the City Council from Assemblyman Bruce F. Allen.

Allen is chairman of the State Assembly Judiciary Subcommittee on Tidelands. His committee has been investigating tideland leasing practices for a year.

The troubles seem to stem from the city's alleged lack of standard, uniform procedures for bid offers and acceptances.

Allen's letter charges that favoritism entered into granting leases; political insiders were granted "carried working interests"; a large acreage of tidelands was leased to a paper corporation with no assets; and "competitive bids by responsible oil companies have been ignored."

To correct the situation, the subcommittee suggests that the leasing system be standardized.

The suggestions are that the city use expert consultants, ask for competitive sealed bids, specify all factors of the proposed lease in the invitation to bid, give to newspapers and oil companies notices of proposed leasing, and allow at least 60 days between the bid notice and the deadline for filing of bids.

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Citronelle: A Big Field Comes Back

Alabama's big Citronelle field—called a dead duck just a year ago—is enjoying a new surge in development.

Just a year ago, cynics labeled the field a lemon. Today, the "lemon" is producing more than 400,000 bbl. per month, and six rigs are active in the field.

The biggest factor behind the field's new lease on life is technology.

The field—with numerous technical headaches—is admittedly still no ideal dream for operators. But the fact remains that a so-so well in the field will pay out in two years, and a good one in little more than a year.

Experience has shown that fracturing is a must in the field.

Not a single well has been completed in the past year without first being fractured. This has become as routine as running tubing.

Oil men shuddered at the 12½% porosity and low permeability they found in the field. But they have found that through fracturing, wells have maintained a satisfactory production.

Another lesson learned through experience in the field has been the necessity for heaters.

High paraffin content in the crude was constantly shutting down wells and clogging lines until heaters were installed. The heaters are powered by gas from the wells.

Gulf Oil Corp., purchaser of all the field's crude, and operator of a 30-mi., 6-in. line to Mobile, says the heaters pay for themselves quickly by slicing off downtime. The heaters are kept in operation even in the summer.

Other technical devices have also helped. The workhorse of the field has been the Kobe pump. Virtually every well completed in the past year and a half has been rigged up with a Kobe.

Another technical device that may play a part in future development is dual completion using a single string of tubing, with a simple, wire-line-controlled valve.

A big concern now at Citronelle is unitization.

Operators are meeting regularly at Jackson, Miss., to try to work out a plan for the field.

The Alabama legislature already has provided that the field can be unitized with the approval of 75% of the royalty owners.

Getting names on the dotted line will be a sizeable task, because of the large number of landowners involved.

Unitization would pave the way for some sort of secondary recovery, which, say many, would be a lifesaver for the field.

Rapidly falling bottomhole pressure has caused wide concern among operators. The pressure has slumped from an original 5,000 psi. to about 1,500 psi. at present.

Core Laboratories, Inc., Dallas, was called in recently to find an answer to this problem. The company made an extensive reservoir survey of the field.

Core estimates that primary recovery will amount to less than 5% of the oil in place, or about 14-million bbl. Secondary recovery could boost that figure to more than 20%, or almost 65-million bbl.

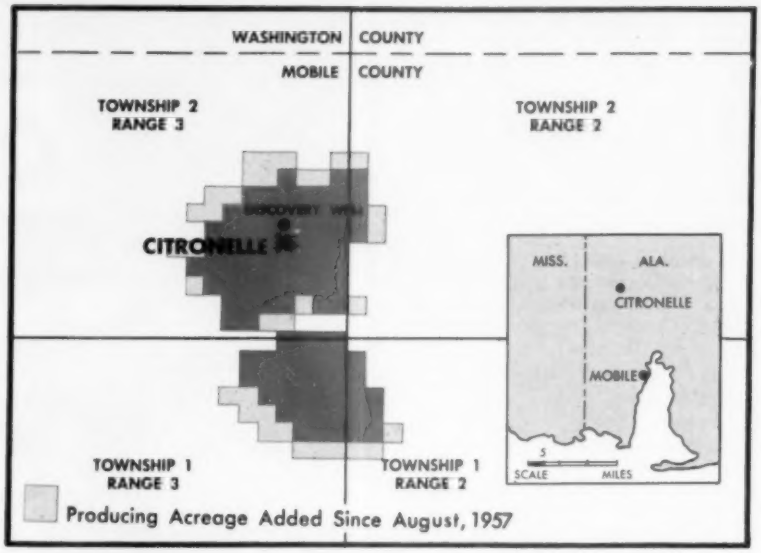
Core is expected to issue a report soon on the economic feasibility of waterflood, gas injection, and miscible phase programs. So far, waterflooding has received the most support.

The firm says the bubble point at Citronelle will be reached at about 500 psi.—only a few months away at the present pressure drop of about 5 psi. per day. In preliminary reports, Core says that the field will produce about half as much crude after the bubble point is reached as it has when it reaches that point.

Core estimates the field's reserves at 300-million bbl. Just a year ago, reserves were estimated at half that amount.

There are still some big unanswered questions at Citronelle. The most obvious—after three years of asking—is how big is the field.

A total of 127 producers and six dry holes haven't proved the limits of the field.



Magnolia Petroleum Co. recently drilled 2 mi. southeast of the edge of the field, and brought in a producer located 5 mi. southeast of the discovery.

A puzzling thing was the bottomhole pressure of 4,200 psi., just 800 psi. less than the discovery when it was brought in.

Engineers say that only more wells will tell whether the high pressure is a result of poor communication in the formation or indicates an entirely new field.

The 127 producing wells include two that were abandoned earlier as dry holes.

One, Zach Brooks Drilling Co. No. 1 Coggins-Altmayer, was abandoned as noncommercial in June, 1956.

The upper Rodessa was poorly formed, and at that time little faith was put in the lower Rodessa.

Last year, Jett Drilling Co. and Central Oil Co. recompleted the well from the lower Rodessa, and the well has made more than 25,000 bbl. in nine months of operation.

Jett also reworked another dry hole this year, a wildcat off the southwestern flank of the field. The company went down to the Hosston, found nothing, then plugged back to the upper Rodessa. The well averaged about 120 b/d during its first two months of production.

Citronelle—despite its problems—now accounts for 79% of the crude produced in Alabama.

The field has produced more than 8¼-million bbl. since its discovery in August, 1955. Its average production is slightly more than 13,000 b/d.

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What's New / IN EXPLORATION, DRILLING, PRODUCTION

Three ACT Plans O.K.'D

The Texas Railroad Commission has granted permanent approval for automatic lease operation and automatic custody transfer of oil on a Gulf Oil Corp. lease in the Texas Panhandle.

The commission approved the equipment installed by Gulf on its S. B. Burnett lease, Panhandle field, Carson County.

The commission also approved two ACT applications by Humble Oil & Refining Co. and Humble Pipe Line Co., and by Shell Oil Co.

The applications involved Shell leases in the Wasson field, Gaines and Yoakum Counties, West Texas, and a Humble lease in the Lovells Lake field, Jefferson County, Texas Gulf Coast.

Lease Sales

Following a "good response" to a lease prospectus, the University of Texas has offered for oil and gas leasing on Sept. 30 a total of 44,443 acres in West Texas.

Included is acreage in Terrell County, where oil development has been under way recently.

The university hasn't offered land for mineral leasing since October, 1957, when bonus bids were disappointingly low.

A South Dakota oil and gas lease sale planned for July 23 will offer 45,917 acres spread over eight counties.

Counties and their acreage are: Butte, 1,280 acres; Haakon, 28,152 acres; Harding, 640 acres; Meade, 9,915 acres; Pennington, 2,149 acres; Perkins, 317 acres; Stanley, 2,665 acres; and Ziebach, 799 acres.

The California State Lands Commission has scheduled a meeting for next week to act on offers for tidelands leases.

Bonus proposals for five parcels off the Southern California coast totaled more than $55-million (PW—Jul.4 '58,p12).

A bonus of $61,333, or $511.11 an acre, for a tract in Love County topped last week's sale of Oklahoma oil and gas leases by the Muskogee area Office of Indian Affairs.

The top bonus was paid by Pasotex Petroleum Co., Houston, for 120 acres near Southeast Marietta pool, opened by Pasotex.

A total of 47 tracts, covering 3,159 acres, were sold for $94,987.77, or an average price of $30.31 per acre. There were 112 tracts offered, covering 7,736 acres.

Only 8 tracts of 41 taken attracted bonus bids at the July 2 sale of oil and gas leases on Colorado state lands.

A total of 94 tracts, covering 18,519 acres, were offered. High per-acre bonus—$2.50—was bid by James S. Holmberg, for a Morgan County tract. Sunray Mid-Continent Oil Co. was the most active bidder.

•

Operators in Rusk County, East Texas, have asked for a 10% reduction in tax valuations because of current low oil production allowables.

The petition was presented to the County Commissioners' court.

Oil properties in Rusk County are presently valued at about $80-million. The cut sought by producers would slice about $77,000 from the county's tax income, based on the present tax of 95¢ per $100 evaluation.

•

Sunset International Petroleum Corp. has purchased 330,000 shares of common stock of Tradewinds Exploration, Inc., for $250,000.

Sunset also has received 5-year options on an additional 250,000 shares of Tradewinds stock. Tradewinds has oil and gas concessions on about 5.4-million acres in Panama, and an interest in 2-million acres in Honduras.

•

A new company, called United Canso Oil & Gas, Ltd., has been formed by the merger of Canso Natural Gas, Ltd., and Canso Oil Products, Ltd.

United Canso holds interests in acreage in Alberta, Saskatchewan, British Columbia, Quebec, and the Yukon Territory. Production from these interests in 1957 totaled 400,000 bbl. of oil and 2.6-billion cu. ft. of gas.

•

Glasscock-Wilson, Inc., Shreveport (La.) drilling company, is now the Fred Wilson Drilling Co. Wilson recently paid $1,280,000 for the other half of the firm, formerly owned by Charles W. Glasscock. No changes in personnel or policy are anticipated by Wilson.

Glasscock will devote his time to Glasscock Oil Co., which operates independently of the drilling company.

•

Phillips Petroleum Co. has leased 73,260 acres in northeastern Ohio, where several oil strikes in the past year have touched off a heavy play.

The $146,520 lease deal was made with John A. McGuire, of Erie, Pa. It covers 37,428 acres in Ashtabula County; 20,038 acres in Portage County, and 15,794 acres in Trumbull County.

•

A new book on the history of Navy oil and gas operations in Alaska is now available.

The 192-page volume is the first of five dealing with ten-year activities in Naval Petroleum Reserve 4, above the Arctic Circle.

The book, "USGS Professional Paper No. 301," is available for $2.25 from the Superintendent of Documents, Washington 25, D.C.

•

A directory of Texas securities dealers, including those limited to oil and gas leases, has been published by R. W. Byram & Co.

Dealers in oil and gas securities are listed separately. The book is available from the publisher, Drawer M, Capitol Station, Austin. Price: $10.

•

Correction

In the story, "Lake Erie Play Heads for Record Year" (PW—Jun.27'58, p22), the cost of a gravity survey, as reported, is correct for land gravity work, but is not correct for underwater gravity work in that area.

Offshore, if there is an average of one station for each nine acres (approximately equivalent to the ¼-mi. x 3,000-ft. grid on land), about 555 stations would be needed to cover the 5,000 acres. If a fee of $25 per station is charged (this can run to as high as $75 in some places), the lowest possible total cost for under-

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water gravity work in the Lake Erie area would be about $14,000 per 5,000 acres.

•

Drilling Highlights

West Texas—Jake L. Hamon No. 1 Edna Page, labor 11, league 303, Dawson County school land survey, Gaines County, was completed for 239 b/d of 48-gravity oil through 18/64-in. choke and perforations at 11,310-36 ft. in the Strawn. The discovery is 3 mi. north of Amrow pool.

In Upton County, Gulf Oil Corp. No. 498 J. T. McElroy, section 187, block F, CCSD&RGNG survey, Pennsylvanian discovery in the shallow McElroy pool, was completed for 345 b/d of 43-gravity oil through 20/64-in. choke and perforations at 9,032-52 ft. Nearest Pennsylvanian production is 4½ mi. northeast, in the Texel pool.

North Texas—Woodson Oil Co. No. 2 H. L. Robertson, F. L. Green survey, Young County, was completed for 1,200 b/d of 42-gravity oil, based on 4-hour flow of 200 bbl., through 16/64-in. choke and perforations at 4,221-26 ft. in the Marble Falls conglomerate. The find is 2½ mi. southeast of Beth Bend conglomerate pool.

Nebraska—Sunburst Petroleum No. 1 Hack, section 34-13n-54w, Kimball County Hack field discovery, was completed on the pump for 120 b/d through perforations at 6,099-103 ft. and 6,104-09 ft. in the J sand. The discovery is 2 mi. northeast of Allely pool.

Also in Kimball County, British-American Oil Producing Co. No. 1 Bowman, section 35-16n-55w, was completed for 140 b/d on the pump through J sand perforations at 6,112-17 ft. The well opened the Bowman pool.

Montana—Skelly Oil Co. is running casing at No. 1 Blackfoot, section 36-36n-7w, Glacier County wildcat, after recovering 448 ft. of oil and 40 ft. of water on 2-hour drillstem test of the Madison at 3,612-30 ft.

North Dakota—Calvert Drilling, Inc., has completed two discoveries—one in Burke County, and the other in McKenzie County. No. 1 Huff, section 4-162n-90w, 2½ mi. southeast of Flaxton pool, Burke County, was completed for 83 b/d oil and 30 b/d of water through perforations at 5,753-60 ft. in the Madison. No. 1 Signalness, section 2-150n-96w, McKenzie County, flowed 48 b/d of oil and 25 b/d of water through 14/64-in. choke and perforations at 9,386-94 ft. and 9,414-28 ft. in the Madison. The discovery is 2 mi. west of Blue Buttes pool.

Louisiana Offshore—Sinclair Oil & Gas Co. No. 4-A, Block 190, Eugene Island area, in 71 ft. of water about 35 mi. off St. Mary Parish, flowed 85 b/d through 6/64-in. choke and perforations in a Miocene sand at 9,272-78 ft. The discovery is on a 5,000-acre block owned by Sinclair, El Paso Natural Gas Co., Sohio Petroleum Co., and Peoples Production Co.

Colorado—Far West Trading and Bel-Air Oil No. 1 Etchinson, section 35-5n-60w, Morgan County, flowed 480 b/d of 34-gravity oil through 20/64-in. choke and perforations at 6,138-46 ft. in the D sand. The discovery is 1¼ mi. northeast of Orchard field.

Wyoming—Ohio Oil Co. No. 1 Wamsutter Unit, section 12-20n-95w, was completed for 7.5-million cu. ft. of gas daily through perforations at 9,594-624 ft. in the Mesaverde.

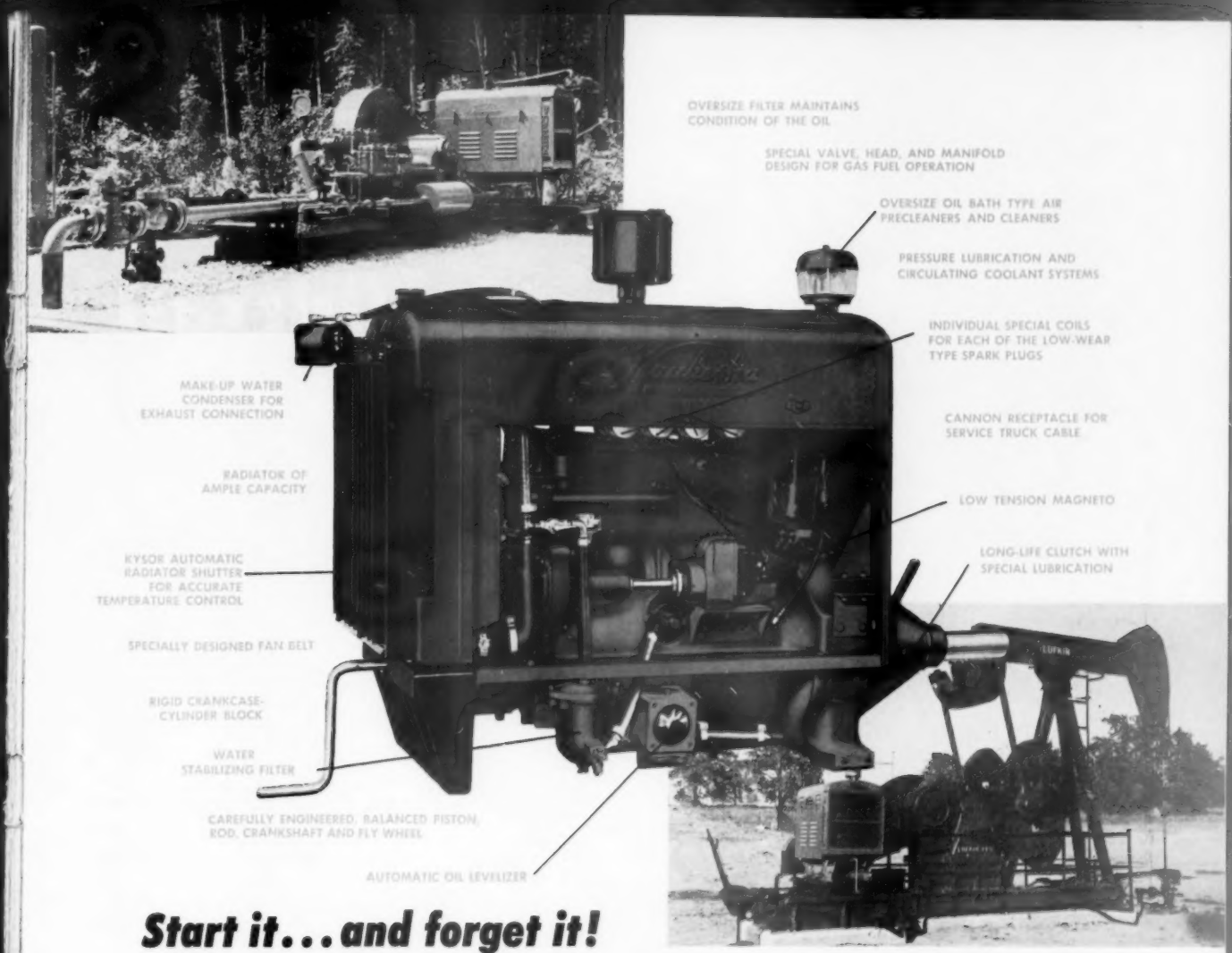
In Fremont County, Petroleum, Inc., No. 1 Tribal, section 15-5n-1w, flowed at the rate of 7,640,000 cu. ft. of gas daily through perforations at 1,384-90 ft. in the Crow Mountain. The prospect is 6 mi. east of production at Sheldon Dome.

West Virginia—Alaska Oil & Mineral Co., Inc., No. 1 San Antonio, Nicholas County, flowed more than 2-million cu. ft. of gas on open flow from the Grienbrier lime at 1,804 ft. The discovery is 1 mi. from nearest production.

Oklahoma—Calvert Drilling, Inc., No. 1 Straka, section 32-11n-3w, Oklahoma County, opened a Bartlesville sand pool 3½ mi. west of the south end of Oklahoma City field, flowing 33 b/d of oil through 24/64-in. choke and perforations at 7,162-72 ft.

Mississippi — Marlin Exploration, Inc., No. 1 A. J. Brown, section 39-6n-3w, Adams County, was completed as a Wilcox sand oil discovery, flowing 160 b/d of 42-gravity oil through perforations at 4,815-17 ft. The discovery is 1 mi. east of New Era pool.

Ohio—Erie Natural Gas Co. No. 1 Erie Murtha, Monrow Township, Ashtabula County, was completed on the pump for 100 b/d through perforations at 3,323-33 ft. and 3,356-93 ft. in the Medina. Operator also found gas, estimated at 100,000 cu. ft. daily, in the Newburg at around 3,150 ft.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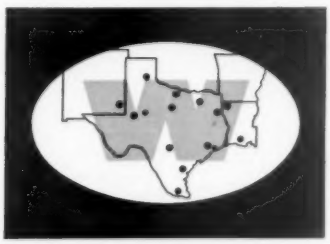

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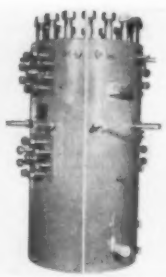
● **Budgets are being watched closely in just about all production departments. Every saving is being courted, all possible steps are being considered carefully.**

● **Remedial well work, fracturing, acidizing, and the like, is being deferred in some instances. But some companies are using this avenue to bring in more revenue.**

● **The move to update state laws and regulations, especially with respect to well spacing, unitization, proration, and equipment, is on the increase.**

● **New tools and techniques are being applied in more areas; technical details are being re-evaluated, and changed where conditions show it's more profitable.**



Production's Basic Problem: How to

While this year's business slump finally appears to have bottomed out and reversed direction, it has had a profound effect on the producing segment of the petroleum industry. Management is demanding, and getting, what amounts to a crash program on efficiency. Result: An economy effort unparalleled in recent years.

The striving for efficiency and economy is a continuous process, of course. But even those production departments with enviable records in the past haven't been spared in the current drive.

The push involves every angle of production activity—from labor to new recovery methods; from data processing to workovers; from budgets to automation.

What's more, even the production men themselves concede the necessity, even the desirability, of the current pressure.

To one, whose company has considerable Texas production, the situation stacks up like this:

"The plain, bald fact is that we've got wells that will produce for 31 days, and we're permitted to produce them for only 9 days or so. It's pretty hard to make a profit in producing a well if you have to keep it idle for 22 days out of the month."

Says another: "In the present situation, we can't increase the rate of production materially, and we can't count on a big, fat crude price increase. So the only thing we can do is cut costs, one way or another."

The assistant production superintendent for a major company sees at least a thin sliver of silver lining:

"Let's face it—most of our supervisors have never gone through a lean period before. It'll do them good. I can remember back in the 30s when we had only one rake for a whole producing district.

"Now there's a rake in the doghouse, a rake at the tank farm, a rake at the lease house—and plenty of shovels.

"We pinched pennies before, and we can sure do it again if we have to."

Never before has the phrase, "Time is money," meant more to production personnel.

A division chief engineer trying to cut expenditures points up this fact:

"Probably the biggest thing in all this—doing work out in the oilfield where you're using services, expensive ones—is how the hell to save time.

"Anything that's time-saving is money-saving. This sort of thing is pretty important. We spend $750,000 to $1-

● **Paperwork is being minimized, or eliminated, wherever possible. Use of machines and computers in administrative work is on the increase.**

● **Labor savings are as important as time savings. Companies aren't firing people wholesale—they're just not replacing all of those who normally leave.**

● **Broad-gauge cost-cutting conversions, such as field electrification, automatic lease operation, and the like, are being stepped up strongly.**

● **Top management is carrying the cost picture, with facts and figures, directly to field personnel, emphasizing the need for economy at all levels of operation.**

Get More from Men, Money, Materials

million a year just on remedial well work in this division alone."

But while the heaviest emphasis today is on the cost factor, there are other important challenges, as well. And the developments on these fronts are encouraging.

The production man is keenly aware of the increasing responsibility for bringing more of the oil already discovered out of the ground.

He is concerned with the fitting of statutes and regulations to modern conditions.

And he's working hard to improve and advance the physical mechanics of production.

That's the general pattern. Now for some details.

With the pressure on, from the top echelon all the way down to the lowliest blueshirt, production men have moved fast and far in every conceivable direction to increase efficiency and economy. So many of the moves are common to almost every company that they form a general, industry-wide mosaic.

This pattern involves both broad cost-cutting approaches and minute details.

Some of these steps have shown immediate, tangible results; others are slower to yield specific dollars-and-cents figures. Then, too, there is a difference in attitude about the present drives. Economy waves are almost as regular as the seasons in some companies. But this time everyone knows there is more to it than another office directive—their very jobs, and even the survival of the company itself, may be in the balance.

The first, and most drastic, action in most instances has been aimed at the budget. How much of the results could be called "savings" is debatable. But it certainly has choked off, at least temporarily, the outflow of cash.

The Southwestern production manager for one major declares: "It's come to us [from top management] that our cash position is short, and that 'if you can avoid spending a dime, why, avoid it, because it's life or death to us.'

"And, brother, we're doing it."

He adds that his department has always used pretty good judgment in planning expenditures. So, "everything that is cut out means something that, in some sense, is economically, or otherwise, good to do.

Another typical comment, from a Southwestern production division official: "We're re-examining budgets, re-

continued ▸

Special Report

PRODUCTION

FRACTURING JOBS, such as this one in West Texas (note complex wellhead assembly), are being deferred by some companies in order to cut costs. But many other companies are turning increasingly to reservoir stimulation and remedial work to hike profits.

shuffling, watching everything. Everybody understands why."

"You make money by the investment of it in some kind of project or enterprise. But we're in the process of not investing. Why? Simply because those investments require so many dollars, and we haven't got them."

A large Mid-Continent operating company's top producing people say their department plans to hold direct expenses for 1958 at $1½-million a month, "in spite of the facts that a general pay raise in the late spring will increase operating expense approximately $35,000 per month, the cost of materials and services probably exceed 1957 costs by 10%, and a large volume of our production is from secondary recovery projects."

This department's direct expenses averaged $1.2-million a month during 1957, but had risen to $1.6-million during January and February, 1958. Obviously, in bringing that figure down—as the department did for March, April, and May—in the face of increased costs, the department did some flat budget-slashing.

But a fine bead is being drawn on scores of specific items—remedial work, fracturing, and acidizing, for example.

A Southwestern spokesman for one major says: "Because of the general conditions of austerity, we are cutting down the number of workovers. We are doing only those where, if we fail to do something right away, some permanent damage to the well might result.

"Say a given well has declined in production beyond top allowable, and we feel that by spending from $3,000 to $5,000 in cleaning it out and stimulating it, we might get a nine-month payout by restoring it to top allowable. Now we are deferring that type of workover because we're cutting expenses, and oil's a glut on the market anyway.

From another company comes this view: "We're looking closer at the workovers, particularly fracturing and acidizing. We're making our field men base their recommendations on experience, not just on what somebody says the well will make after it's worked over."

This company cites, as an example, one well recently recommended for a $9,000 workover operation. Reviews in the field and in the main office resulted in trimming the amount needed to $1,500 by cutting out "many of the frills and fancy work, and not doing some of the work until we're really sure we need it."

This inclination to go slower on remedial work carries over into other services. Many operators, for instance, are running far fewer logging services per hole in completing new wells.

But while the general attitude indicates a slowing down of remedial work, there certainly is some convincing evidence that such programs can improve the cost-profit picture substantially.

Cities Service Oil Co., for instance, spent $1,001,000 during 1957 for remedial work on wells. To Mar. 1, 1958, the company had experienced a 194% return on the investment.

"The increasing earnings result from 725,000 bbl. of additional oil recovery made possible by the 250 jobs performed," says a Cities Service spokesman. The work

continued ▸

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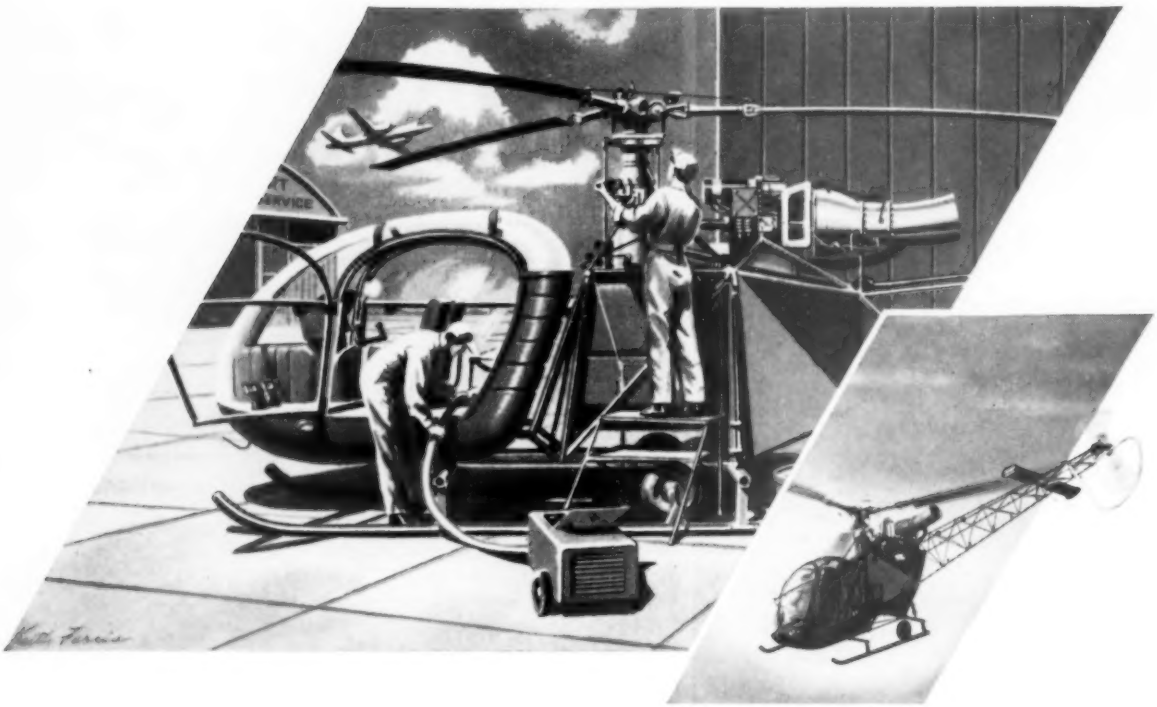

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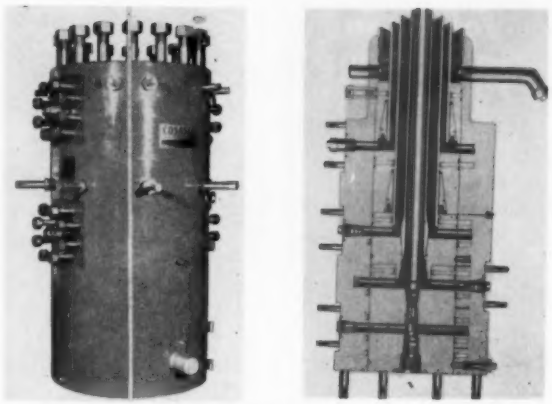

COSASCO UNITIZED WELLHEAD, an example of the new look in such assemblies, is only 44 in. high (left). Cross-section (right) shows four strings of casing, in addition to the production tubing, landed in 55-in. high model.

included cleaning out, acidizing, hydraulic fracturing, recompletions in new producing horizons, and related well-stimulation activities.

Here's the way it breaks down:

Cumulative:	
Increased gross production	725,000 bbl.
Increased net lease earnings	$1,940,000
Cost of remedial work	$1,001,000
Return to Mar. 1, 1958	194%
Average age	7.8 months
Current:	
Increased gross production	2,500 b/d
Increased monthly net lease earnings	$202,000
Monthly return on investment	20%

In its Western Kansas division alone, Cities Service says, the 1957 remedial program "will return $10 for every $1 spent. The $180,000 spent in 1957 resulted in increasing estimated recoverable reserves 957,000 bbl., at a cost of only 19¢ per bbl. The workovers were 75% successful, with casing repairs and acidizing jobs being the most profitable.

"In 1957, 75 workovers were performed at an average cost of $2,400—compared with 71 jobs costing $2,250 each in 1956."

Another example is equally thought-provoking:

In its Hobbs (N.M.) district, one company spent $200,000 on remedial work in 1956. This company had received a 100% payout by April, 1957, and chalked up net increased earnings of $132,000. "During 1957," says this operator, "36 workovers were performed at a cost of $472,000. By the end of 1957, 69% were considered successful, and 68% of the expenditure had already been recovered."

There also is more emphasis on cost prevention, particulary in chemical treatments and corrosion control.

Cities Service told PETROLEUM WEEK that by selecting and applying more effective chemicals last year in nine eastern Kansas waterfloods, involving 1¾-billion gal. of water, chemical costs were reduced to $34,500, compared with an earlier figure of $77,400.

In western Kansas, Cities Service estimates that it saved $91,000 last year through corrosion control alone—cathodic protection (magnesium anodes for vessels and casing and DC electric current at the well), and chemical inhibitors. The program has tripled the useful life of stock tanks, heaters, treaters, separators, and casing, the company says, plus reducing well-pulling and repair costs because of sucker-rod breaks and tubing leaks.

Recent advances in methods of testing inhibitors has helped operating companies by reducing drastically the time required to evaluate them.

Says one Mid-Continent operating company: "We have standardized on our corrosion inhibitors as one move to cut our chemical costs. In various West Texas fields, we are having difficulty with corrosion eating through tubing and casing strings. By standardizing on one 'family' of inhibitors—amine salts in this case—we are able to save money."

Technical details—such as casing size and improved completion practices—are receiving closer attention.

"You are going to see more dual and triple completions," says the official of one large Tulsa-based operating company. "This gives the operator a chance to save money in the long run. And we think permanent-type completions are helping to cut costs."

One operator reports that a single well, which might cost around $100,000 to drill and complete, can be dually completed for only about $15,000 more. This major had 121 dual completions in 1957, compared with 55 in 1956 (it now has a total of more than 800). A spokesman notes, too, that "all of the advantages of dually completing a well on dry land are often magnified tenfold when you drill in the Gulf of Mexico."

An official of another large operating company agrees: "During 1957, we dually completed 14 out of our last 19 wells drilled on the Gulf Coast," he says.

Even triple and quadruple completions are entering the picture, as previously reported by PETROLEUM WEEK.

The first quadruple completion was posted in Texas a few months ago, and was followed in June by another in the Gulf of Mexico, off Louisiana. And since Texas's first triple oil completion was approved by the Texas Railroad Commission only a few weeks ago, requests for two more oil triples have been received by the commission. Others are expected to come in swiftly now.

Another example of cost-cutting in completion work comes from Ralfe D. Reber, president, Petroleum Management, Inc. He reports: "We save $50,000 a year by setting 4-in. instead of 5-in. pipe, at the rate of two completions per month." He says the company once used 4-in. pipe only in shallow wells with short reserves. Now it runs it in 4,000-ft. wells with relatively large reserves.

A West Coast major takes a different tack, cutting its Christmas tree cost from around $3,800 to about $2,300 by installing half-screw, half-flange trees, instead of all-flange.

A division production chief in Dallas remarks that "cutting out workover frills goes back to the way a well is completed in the first place." His company also is strong on permanent-type completions, with workovers performed on wirelines. For one thing, when this company completes a well in a field characterized with a workover history, it

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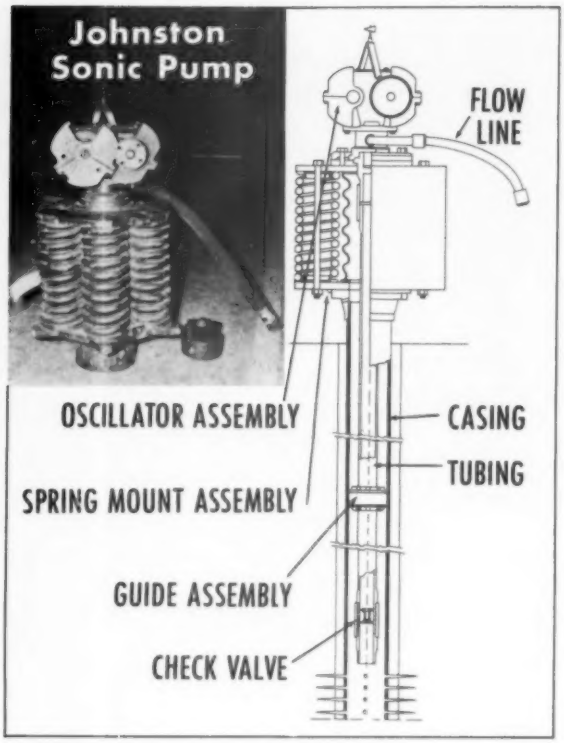
DUAL COMPLETION GAS WELL, still relatively rare in some states, typifies growing trend toward multiple completions.



SONIC PUMP lifts fluid to the surface by resonant sound waves, set up by the oscillator mounted on a spring platform.

keeps the perforated interval "down to the minimum that will allow us to get a satisfactory well."

That makes it possible to move up the hole later on with new perforations, "without having to squeeze off the old perforations and take all the time to drill all that out and check for shutoff." Instead, a retainer is set above the old perforations, cement squeezed out beneath it, and the retainer acts as a shutoff.

There is a concerted effort not only to improve existing equipment, but also to come up with entirely new, even revoluntionary, tools, even in areas where practices have become effectively standardized.

The improvements keep coming in a steady stream—from the laboratories, and through experience. Though most of these improvements are generally minor modifications, their aggregate force is tremendous. These improvements run the gamut from power swivels and tongs to more efficient rig designs and layouts.

Then, too, there is considerable research on entirely new tools and methods. One example, for instance, is a sonic pump that has been under development for six years. Rights to the pump, originally developed by Albert G. Bodine, noted sonic scientist of Los Angeles, have been obtained by Johnston Testers, Inc., subsidiary of Schlumberger Well Surveying Corp. Marketing of the units by Johnston is expected to begin around Oct. 1.

Unlike conventional oil-well pumps, the sonic pump has no plunger, working barrel, sucker rods, or walking beam (see drawing and picture). An oscillator mounted on a spring assembly sets up sound waves in the tubing, propelling the liquid upward by virtue of a series of check valves that automatically open on the downstroke and close on the upstroke. Frequency of the waves and the size of the tubing determine the volume of production. The pump reportedly can operate at very low cost and at a fraction of the energy required of orthodox pumps.

In tests so far, the sonic pump has handled sand volumes as high as 80% without difficulty. On one test, the device pumped out pieces of an aluminum liner that had corroded in the well. The sound waves also inhibit deposits on the tubing string.

In one California test the sonic pump lifted a 10- to 12-gravity crude, with 10% to 20% large grain sand, at the rate of 25 b/d.

Electrification continues to mushroom because the economics favor it.

As a case in point, one company reports that it has replaced central power and gas engines with 250 modern electrical units over the past three years in one West Texas field. It made possible the use of 10 pumpers, instead of 29. The company also credits electrification with a big role in increasing production from 2,200 to 3,400 b/d.

Another company's production superintendent says: "We are electrifying oilfield properties wherever possible,

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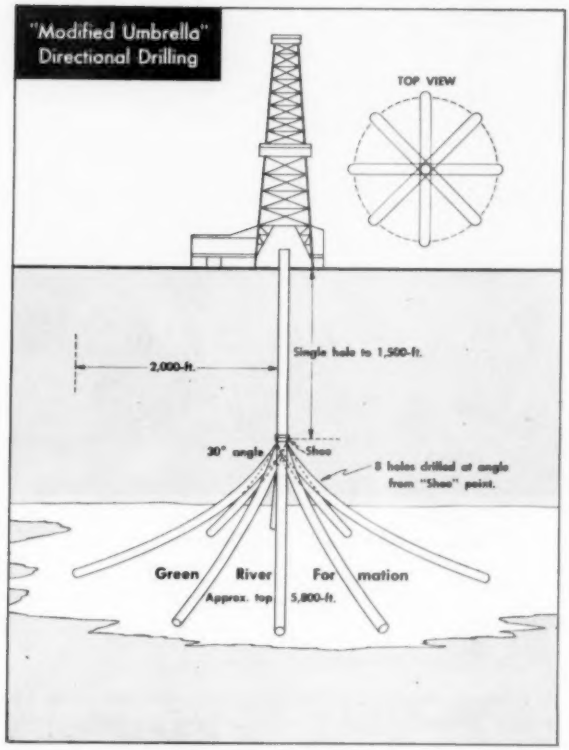

MODIFIED DIRECTIONAL DRILLING plan set up by Standard of California to lick costly production problems in Utah.

everything but our more remote, scattered wells, and we are saving through less manpower requirement, better operation, and easier maintenance."

Economy measures even include "paperwork" reforms.

Sun Oil Co. is one of the companies changing from the daily gauge report system to a weekly report (in Sun's case, an 8-day report). The pumper records all of the production for all of the individual wells under his supervision on one report form, covering the longer period.

"When you spread that through a division, you're beginning to look at pretty substantial savings," says a company official.

Cary M. Maguire, manager for the Russell Maguire interests, which operate in five states, explains a different approach with the same aim:

"We are attempting to streamline our operations, particularly as to office work, because of our limited staff. A chief illustration is the use of printed forms to reduce the number of letters passing between us and our field points, as well as in our dealings with others, particularly the oil service concerns.

"For example, in dealing with mud companies, we use a printed form detailing information, instead of the usual letter procedure."

Maguire's firm also has gone to the weekly gauge report method. "The biggest saving is in time—which, of course, is money," he comments.

The "little things" have assumed a big place in efficiency-economy thinking.

Says one production superintendent: "We have concentrated on economy in the past. But, by and large, it related to the larger, more obvious means of economizing—big items, where you can compare one approach or one method with another, and can look at savings here in your initial investment of, say, $2,000, $3,000, or $5,000.

"We still are looking at things that way. But now we are finding it absolutely essential to look harder at the little things.

"I mean, for example, looking closely at the mileage that's being charged by pumpers in making the rounds of their properties.

"Then we're doing such simple things as tying all our tanks together at the top with overflows, so a man doesn't have to sit out there 30 minutes or 45 minutes waiting for that tank to fill all the way up, then switch tanks."

One large producing company has achieved savings of thousands of dollars a year, simply by encouraging suggestions from its field personnel—suggestions which have led to many sound dollar-saving actions.

The list of savings in other "little things" is so long it defies enumeration. It includes such practices as not leaving vehicles idling unnecessarily, painting field facilities all one color, keeping electrical switch boxes closed against dust and dirt, and many, many others.

There also is a tendency to cut down on company attendance at industry conventions.

Salvage, as always, is a big money-saver. The difference is that now this is necessary, not just desirable.

This has become particularly evident recently in Kansas, where the state's 1957 pollution action has increased the abandonment rate. Many of the operators, major and independent alike, now are using salvaged pumping units, rods, tubing, tanks, and the like, for new completions, rather than selling them.

Administrative and operating forces are being reorganized, or "streamlined," in some cases, too.

A typical change is one being made by a major, which is "realigning" one of its production divisions in the Mid-Continent and combining its East Texas and Gulf Coast divisions.

"Our efforts at increasing efficiency and saving money at the top supervisory level are directed toward this type of action, rather than at elimination of personnel," explains one of the company's production officials.

"We cannot operate without competent superintendents and engineers. And we should be upgrading and training personnel in both categories, because much of our future savings will necessarily depend on them."

During the past few years, there has been a tendency to enlarge offices and staffs in the Rockies as activity expanded there. Now, several companies have closed offices in some places, shifting and consolidating operations at previous established offices.

And some operators have closed field offices, with field superintendents now reporting directly into the home office.

All of these steps have one aim: better use of manpower.

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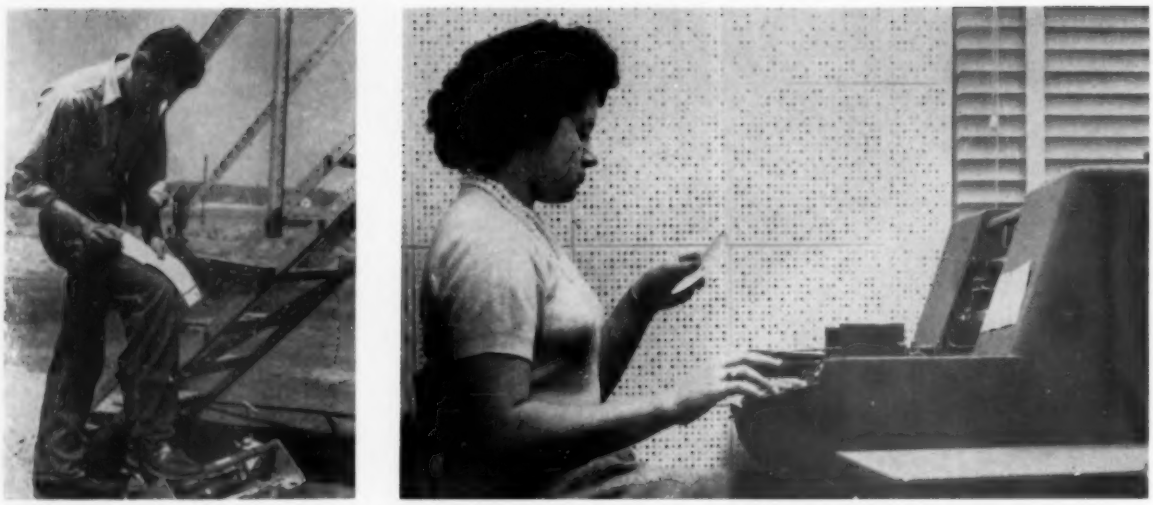

AUTOMATED ACCOUNTING is increasing as companies seek to trim paperwork costs. Gauger (left) fills out run ticket, which goes to office where it is combined with others and recorded on Remington Rand punch cards (right).

There have been sizable reductions in production forces, but no mass layoffs. Production managers are leaving personnel decreases to normal attrition, and holding down labor costs by careful planning.

The reports from the Southwest, the Gulf Coast, the Rockies, the West Coast, and the Mid-Continent producing areas are virtually identical:

"Companies are gradually cutting down on personnel and are more reluctant to replace those who retire . . . Normal attrition probably is in the general interest of efficiency . . . We're not hiring any new men or replacing any who resign unless it is absolutely necessary. Instead, our various departments are absorbing additional work . . . The tendency is to tailor man-hours in keeping with reduced production . . ."

One Mid-Continent operator is spreading its on-duty working force thinner now on holidays, which require a double-pay rate. As a result, the company saved $4,000 last Christmas, compared with the previous year, and more than $1,000 last Good Friday.

"A thousand dollars may not seem like much," says an official of this company, "but these items add up to big savings in a year's time."

This same company reduced its manpower on its leases in one state by 20 classified men, who were retired or transferred to other areas. It was accomplished by installing water-level and oil-level controllers on pumping engines, knock-off devices on beams, and over-flow lines on stock tanks. Each remaining pumper was able to handle more wells, while production remained steady except for normal decline and proration.

Here is what this program means, the company says, in dollar savings for a year:

Payroll savings (including fringe benefits)	$95,000
Car allowance	$6,500
Contract pumping absorbed	$6,000
Total savings	$107,500

Furthermore, the installation of the equipment allows unattended production on the leases on holidays, making possible an additional saving of some $35,000 in extra wages and car allowances.

Production chiefs in many areas are coming up with similar methods, resulting from meticulous planning.

A recent study of oilfield labor requirements came up with a conclusion that will surprise some production men, and provoke others into a searching review of their operations. The conclusion: Lease equipment needs much less attention than had previously been thought necessary.

Two major companies cooperated on the study, conducted in a Kansas field. The really significant findings are that the production equipment "is far better than we give it credit for being," and that labor requirements can be reduced substantially through "new concepts of attendance of that equipment."

The report suggested that the equivalent of 43 pumper jobs could be discontinued by:

(1) Operating leases completely unattended one day each week.

(2) Completely eliminating all night jobs.

(3) Job consolidation as a result of eliminating excessive "waiting" time.

By adopting this concept, one operator estimates a probable saving of about $165,000 annually in one field alone. Lease consolidation could boost the total more than $100,000 higher.

The report was completed so recently that neither company has yet acted on it, but both intend to do so this year. While neither operator is expected to apply all of the principles to every job in the field, local supervisors will be charged with formulating a "master plan" for application "where practical."

There have been additional basic approaches to the efficiency-economy quest.

Standard operating procedure in all parts of the oil patch now includes: Riding the "buyer's market" hard;

ELECTRONIC SORTER, in final step of automated accounting, sorts royalty cards for processing at rate of 800 per minute.

buying off the shelf and avoiding big inventories; seeking bids on jobs which used to be allotted without bidding; keeping an eagle eye on downtime for repairs; more careful evaluation of leases and quicker selling of marginal, uneconomic ones.

But the efficiency-economy "heat wave" has cooked up some unusual ideas as well. A familiar offshore technique—multiple-well directional drilling from one location—is being adapted to dry-land operations. Objective: to help produce some unusual Utah crude more cheaply.

Standard Oil Co. of California, Western Operations, Inc., is experimenting with the method in the Red Wash field, Uintah County. The reservoir, discovered in 1951, contains high-viscosity, waxy crude from the Green River sand at around 5,800 ft. Although the oil is about 32-gravity, it doesn't flow at temperatures below 90F.

This congealing condition makes production a very tough proposition. The result is a complex gathering system of pipes wrapped with heavy wires. A central generating station, operating on lease gas supplemented by commercially-supplied power, provides the heat necessary for production.

Electrical transmission equipment had to be installed for each new well, with the system extended in an ever-widening pattern as development drilling continued.

As many as eight directional holes may be drilled from the single land site if the experiment pans out.

Standard of California's first directional test will be the No. 86-23-21 Red Wash unit. This test will be drilled straight to about 1,500 ft., then whipstocked gradually at the rate of 2½ degrees per 100 ft. It is expected to enter the productive formation at an angle of 30 degrees, some 2,000 lateral ft. from the straight hole.

Total depth, allowing for the drift, is expected to be around 6,100 ft. Subsequent tests, if drilled, will veer off directionally from the 1,500-ft. level (see drawing), at the same angle.

The idea is to eliminate the necessity for the present type of extended, troublesome gathering systems and to help achieve other economies.

It is hoped that the procedure will permit cheaper well completions, and lower production costs, in addition to wiping out the need for the expensive, electrically-heated surface lines.

C. V. Chatterton, district superintendent, says the first test will be subjected to intensive analysis to determine how its drilling, completion, and production costs compare with the savings. Then the decision will be made on other deviated tests.

At least one company has found a way to beat expensive rig-waiting time during workover operations.

Sun Oil's big Southwest division utilizes light workover rigs, which work just 12-hour daylight tours.

"We try to schedule the work so that waiting-on-cement time occurs during the night period, when we don't have any charge accruing from that rig sitting there," explains an official.

"Those charges can mount up considerably. You can find yourself paying $20 an hour for a little workover rig sitting there and doing nothing if you haven't planned the job properly. Using so-called tailored cements that you feel can set properly in 12 hours helps in this."

On the West Coast, air drilling has a new assignment: A possible "noncontaminating" method of recompleting and increasing production in old wells.

Monterey Oil Co. is giving the technique a whirl in the Edison field, Kern County, Calif.

Wells drilled in 1945 to depth around 2,450 to 2,500 ft. into the Schist formation, a fractured type of pay zone, were completed as open holes in the pay section.

Monterey's program involves going back into the holes with air drilling, cleaning them out, and recompleting with liners in the pay zone. By circulating with air, Monterey hopes to avoid contaminating the low-pressure producing section.

If it's successful, the technique not only will have an important bearing on recompletion of other old Schist wells, but could affect additional development of the reservoir.

For the first time, some companies are spreading out their production cost hole cards for field men to see. They're doing more than that—they're making sure top management does the spreading.

The production vice-president of one of the largest Southwest-based major companies and his top assistants have been visting the company's division and district offices, accompanied by staff clerks armed with facts and figures.

The exact economic status of various leases in each area, and the expense items controllable at the field level, are discussed in detail. Complete operating expenses for the leases are compared with revenues.

"Up to this time, the districts were not seeing these figures," observes a company official. "They would see the fact that they made $1 a bbl. or that the lifting costs were 50¢ per bbl. But that doesn't have the impact that the fact that they spent $150,000 this year has.

continued ▸

"This has really got those boys to realizing that they are the ones who control those costs.

"And with high company officials bringing them the facts, they know that this is not something from down the line, but rather from the very top floor."

The president and production vice-president of another major company have just completed a somewhat similar tour, stressing cost consciousness from the level of "absolute top management."

Another major is operating its leases on a "cost-analysis budget" system. "Every superintendent must tell what his operating costs should be for a certain period of time, and he does his best to hit that budget," says an assistant chief superintendent of production. "This method has been working very satisfactorily."

Still another major now provides its field employes, including pumpers and gaugers, with complete information on lifting costs, "on the theory that it will enlist their interest in cutting down those costs."

Yet even with this inclination for direct action by top management, some thinking favors a reverse current—delegating broader authority to field men.

This attitude is typified by one major's action in handing its production foreman (farm bosses) new responsibilities and latitude in its Mid-Continent operations.

"It means a foreman can purchase needed materials without consulting anyone higher in the chain of command," says a spokesman. "He can contract for certain services, such as remedial well work, without submitting contracts to the district office. He can replace small items of equipment without regard to former standard specifications, providing he takes responsibility for its performance.

"He can make personnel decisions without first referring them to the district office. This speeds up operations, cuts down on telephone bills, postage, time, and so on.

"Our management is most interested in this program. The step has been the most satisfactory one, so far, in the effort to lower costs and promote more efficient operations."

Industry-wide, the efficiency-economy drive is proving a boon to contractors specializing in maintenance of production facilities.

In virtually all of the oil-producing areas, operators told Petroleum Week that they are more strongly disposed than ever to turn over their production maintenance jobs to contracting firms for the obvious reason—insufficient work to keep company crews busy, while contractors can keep crews employed steadily by working for several operators. The net result is lower labor cost to the operator.

But at the same time, the contractors are finding a firm disposition on the operators' part to do some close figuring on prices, and even to do some looking around for lower bids where possible.

By letting one job at a time, and by checking regularly on contract prices for erecting tank batteries, and so on, British-American Oil Producing Co., for instance, has chalked up "some pretty significant savings" in the Rockies.

There, as elsewhere, most operators previously had followed a practice of pretty much accepting the contractor's price and letting him go ahead on several jobs at one time.

The use of computers and data-processing machines to handle everything from daily production tabulations to the most complex calculations on reservoir behavior is continuing to increase.

Cities Service, for example, converted just a few months ago to International Business Machines Corp. computers for monthly lease revenue-and-expense accounting. "The new statement provides much information that was not readily available before," says the company.

"Also, a detailed record of expense is distributed to all field offices to facilitate analysis of operating costs."

Cactus Petroleum, Inc., a crude buyer, eliminated the need for 16 additional people in its accounting and royalty payments department by installing a Remington Rand Univac 60 computer. R. F. Black, comptroller and secretary of Cactus, says the job of accounting now is handled in four or five days, by eight people.

"Without the computer, and even with the 16 additional people," Black continues, "it is doubtful that we could handle our present volume at all, considering the complexities. At best, it would take three times as many people, and many essential reports that we now produce would have to be dropped; it just wouldn't be possible to prepare them."

Between lease run statement and royalty payment periods, Black adds, the equipment is used for such jobs as maintenance reports, general accounts, payrolls, and jobs for affiliated companies.

And in reservoir analysis activity, Sun Oil now has in operation at the Dallas headquarters of its Southwest division a third electronic "brain," which prompts one Sun official to comment: "We now have probably one of the finest reservoir analyzing tools in existence."

The most recent of the trio is a "space model," or potentiometric machine, which is teamed with a "time analyzer" machine and a Bendix digital computer.

"All three of them working together enable us to make studies much faster," explains the official. "We think the results are more reliable.

"Machines are not infallible, however. They are only as good as the information that goes into them, and that information sometimes may not be 100% accurate. We start off with the best information that is available, then begin immediately to make alterations to the program as we start to get results.

"Our machines enable us, once we get a program going, to keep a constant check on it and make changes in the field as required. In the process, data that was perhaps originally inaccurate is corrected.

"Every field—every reservoir—is an individual problem."

Lease automation and automatic custody transfer projects continue to soar.

There are few doubting Thomases any more among production people about the benefits of automation at the lease. Enough units have been in operation long enough to prove their reliability and economy.

There are hints of a technical breakthrough—a wellhead production unit for individual wells. This development is still on the drawing boards, but if it works—as the engineers confidently believe it will—it will open broad new avenues for efficiency and economy of operation for the oil industry, and particularly for the small-lease operator.

continued

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AUTOMATIC ELECTRIC

All sorts of recovery techniques are being tested. And there have been encouraging developments in some of the newer processes, particularly in miscible-gas programs and in-situ combustion.

There also is an apparent trend to sweep away some of the obstacles — outmoded regulations, conservative thinking, and the like—to permit easier application of known engineering advances.

To Recover More Oil, Operators Are

The production man still is taking a beating from his toughest enemy. He still is able to extract from the reservoir, on the average, only half, or less, of the oil found by exploration and the drill.

The production man isn't inclined to minimize either the seriousness of this unrelenting battle, or his failure, so far, to win anything like a clear-cut victory. His comment is apt to be phrased something like this:

"Talk about waste. The biggest problem facing the oil business is the fact that, out of every barrel of oil we discover, we only reduce to possession, on the average, some 30% to 35% of it. To the man who discovered that oil, that's a tremendous economic waste . . .

"I think, definitely, that we're not going to go off and leave great big reserves and consider them depleted while 60% or more of the oil is still down there. I think we're going to go back and get it . . .

"Domestically, every barrel of hydrocarbons in the ground becomes more valuable all the time, tending to make recovery projects more economic. But what we really need are better ways to recover the oil from the known reservoirs that we have . . ."

The attack on the problem is moving in two basic directions: Better use of techniques now available, and development of new or improved techniques.

On the first point, this view, by the division chief engineer of one major, is a fairly common one:

"We do know ways to get more oil out of the ground, other than by simply drilling a well, opening the valve, and taking what comes. Most of the difficulty is just the stubbornness of people."

On the second point, there is a general stepping up of efforts to produce oil more efficiently. There is an increasing use of automatic lease operation, multiple completions, and simpler, better tools and equipment. And, of course, the search for better secondary recovery techniques continues at an intensive pace.

Changes in such areas as unitization, well spacing, proration formulas, and rules governing production equipment are the goals of the first approach to the problem.

The chances of attaining these objectives completely and quickly, however, aren't good. There isn't even unanimity among production personnel on all points.

Compulsory unitization, for instance, is one of the most controversial of industry issues.

One production expert for a major operator explains its good points this way:

"We know that if we waterflood a field completely, we can get waterflood recoveries out of it, and we know that we have to unitize to do it. But we can't get folks to unitize. Sometimes I've seen it prevented, and so the matter just languishes there, and that goes on for tens of years, with the operators losing money in the sands that they could have been getting.

"If we were to do what we can, within the limits of what we now know, we'd unitize a field almost at its beginning. We'd design the total program for recovery, right then and there, and put it in. And we'd design the proper conditions of rate and pressure and temperature and the material to use and would start putting it in. And, right there, we'd have the optimum conditions."

But, contrasting with this view, is the attitude of his counterpart in another major company:

"The philosophy of my company is that we resort to unitization only as a last resort—as a resort that is going to yield benefits to us and to everybody else concerned.

"Any time that we can operate our own properties competitively and achieve essentially the same results as we would by turning them over to somebody else, we prefer to stay in there.

"Unitization as a general philosophy—as a cure-all—is not a good one."

While there may be general agreement on engineering principles, there still is sufficient intercompany disagreement on other techniques, methods, and details to prevent immediate solutions of any of the broad problems. Resistance by other industry segments, and state regulations that some producers consider out of date, also impede efforts to apply existing techniques.

The old clear-cut distinction between primary and secondary recovery is dissolving. With increasing frequency now, supplementary drives are being utilized long before primary decline.

The most formidable problem is the same as it's been since Col. Drake made history at Titusville, Pa., nearly a century ago — how to get more of oil-in-place out of the ground, economically.

Using Supplemental Recovery Sooner

Production personnel, meanwhile, have teamed up with research men to press ahead in the other direction. Everything feasible that can be devised is being tried—water, fire, miscible solvents, gas, and various combinations of all of them.

It is a hard-headed effort. Management is insisting on at least a reasonable outlook for a payout. And right now, at least, some production departments are having to hold up even on good recovery programs, because of budgetary reasons.

Never in industry history has management been more receptive to well thought-out proposals for recovering additional in-place oil.

A Sun Oil Southwest division production official says: "All of this division's major reserves—anywhere we've got a substantial portion of any field—either are being subjected to some form of injection, or are under study, and I mean intensive study, right now."

An official in a similar position with another firm, also in the Southwest, says:

"We have been fortunate in having a management that has been very receptive to suggestions that we undertake these programs. We have to substantiate the program in advance, to satisfy them that we're going to accomplish what we say we're going to—but our management has been very understanding, and has permitted us to make the type of investment required."

The assistant manager for a Mid-Continent major adds: "This type of production is very attractive, in that no finding costs are involved, and operating personnel is already available.

"There are some drawbacks to be considered. Secondary recovery development expenditures usually equal primary development expenditures per bbl. of reserves, and operating costs average 20¢ per bbl. more than lifting costs for primary oil. Also, unitization is almost always necessary, and we've run into delays of as much as five years in putting them through.

"Nevertheless, we believe that secondary recovery operations are highly profitable, and we're expanding our efforts as rapidly as possible."

The former sharp delineation between primary and secondary recovery programs is becoming more blurred all the time. The general idea now is to put in a forced-drive project as early as possible in primary production.

Some production men, as a matter of fact, think that secondary recovery programs, as such, may decline.

They point out that the reservoirs susceptible to such programs are becoming scarcer, while the tendency to initiate pressure maintenance and induced-energy drives before a reservoir even begins its primary decline is growing.

What's more, there is some talk of starting "tertiary" recovery programs—taking a third run at recovery of oil in a reservoir.

One operator says, in connection with one of its West Texas properties: "We're sure thinking awfully hard on it. "We flowed it, and then we waterflooded it, and now we're getting ready to go back and take another whack at it, with a miscible-gas drive."

Once production engineers have the kind of additional recovery tool they feel is the answer—a method superior to waterflooding, and one offering a recovery rate that is higher and more economic—there is little question but that they'll "take another whack" at many of the reservoirs.

The waterflood, a method dating back to the 1890's, still is the workhorse among the induced-energy techniques.

According to the Interstate Oil Compact Commission, annual production in the U.S. traceable to water injection of one type or another totals almost 300-million bbl., almost double the figure in 1950.

Waterflood production, itself, is running about 194-million bbl. per year, compared with less than 30-million bbl. in 1950.

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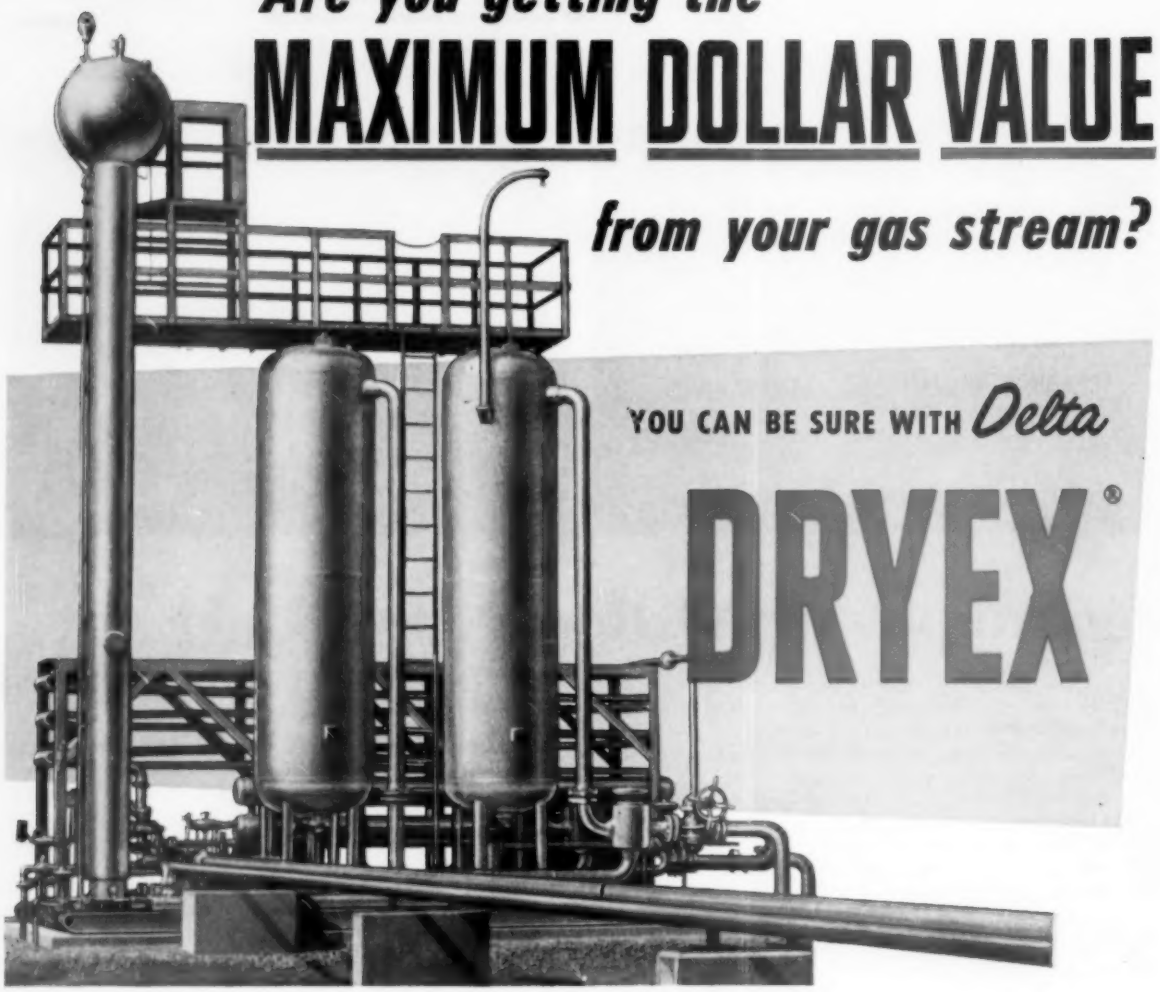

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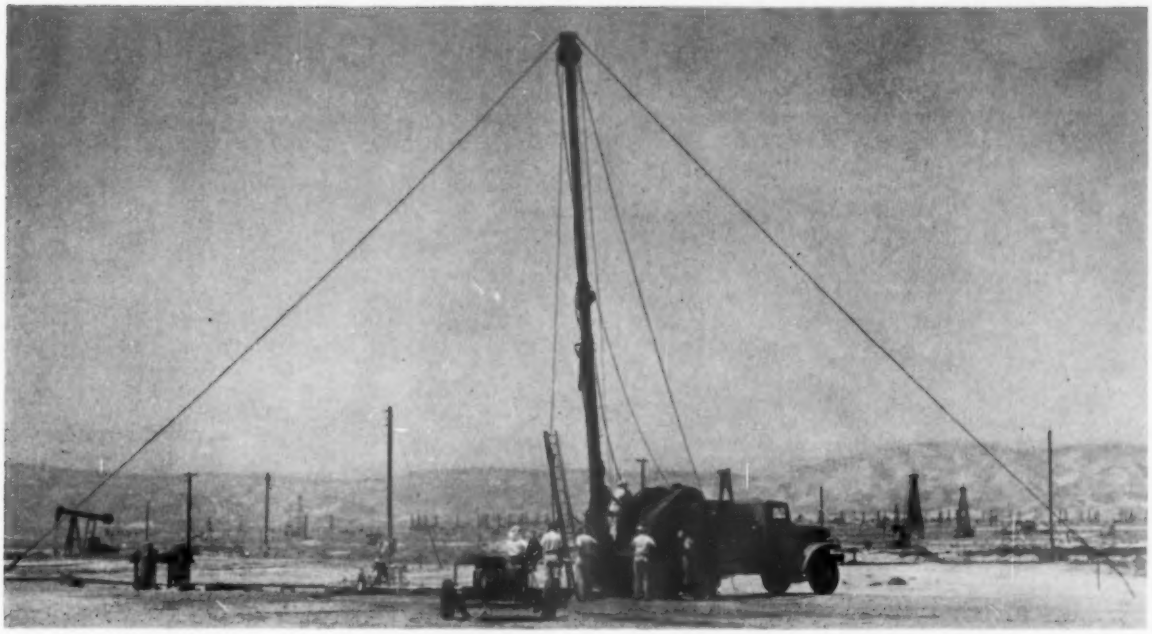


AIR INJECTION WELL is a key element in Standard of California's thermal-recovery test project in Midway-Sunset field.

In Oklahoma, waterflood production now accounts for some 47-million bbl. annually; in Texas, about 39-million bbl.; in Kansas, about 17-million bbl.

Indications are that waterflooding will continue to follow a pattern of gradual, steady increase for at least the next few years, although not making the kind of spectacular leap it did right after 1950.

Even if the number of straight waterfloods begins to fall off, water injection in combination with other types of additional recovery drives probably will serve to keep the growth curve rising during that period.

Illustrating this increase pattern is the rate at which applications have been coming into the Texas Railroad Commission for approval of waterflood programs: 98 in 1950; 96 in 1951; 112 in 1952; 141 in 1953; 160 in 1954; 179 in 1955; 204 in 1956; and 238 in 1957.

The pattern could be altered drastically either way, however, by decisions now being considered by several regulatory bodies in various producing states.

Still classed as experimental, the miscible-gas drive method nonetheless has attracted close attention from production men.

Pilot programs, so far, have ranged from unsuccessful, in an economic sense, to excellent.

Most of them haven't been in action long enough for true evaluations. But just a few weeks ago, Humble Oil & Refining Co. reported "very encouraging" results on its experimental miscible gas program in the Seeligson field, Jim Wells and Kleberg Counties, Southwest Texas (PW—Jul.11'58,p24).

There are indications that close to 100% sweep efficiency might be possible in the program. Humble points out, however, that certain factors must still be examined before application of the process to other areas can be considered.

Cities Service Oil Co. says its LPG program near Pampa, Tex., is also "very encouraging," but that final results are yet to be determined.

Starting injection of butane and propane in July, 1957, the company pumped in 129,000 bbl. of LPG by November, then started injecting residue gas through the first input well. Another 100,000 bbl. of butane and propane were put through a second injection well, which also was converted recently to gas injection. Additional LPG is now being injected through a third well.

Cities Service says oil production in two wells offsetting the first injection well has gone up from 25 b/d to 80 b/d each.

Opinion, so far, on the technique swings between enthusiasm and caution. But there is general agreement that such projects definitely will increase.

Some feel like this official of a major company:

"There's not a shadow of a doubt about it—miscible gas drive recovery programs will be on the increase. The answer to the question of whether they will attain the present volume of waterfloods is easily 'yes.'

"This thing we're dabbling with looks as if it's going to be a real breakthrough to increasing recovery.

"It's going to take a while, though, to run these methods through, and to understand them."

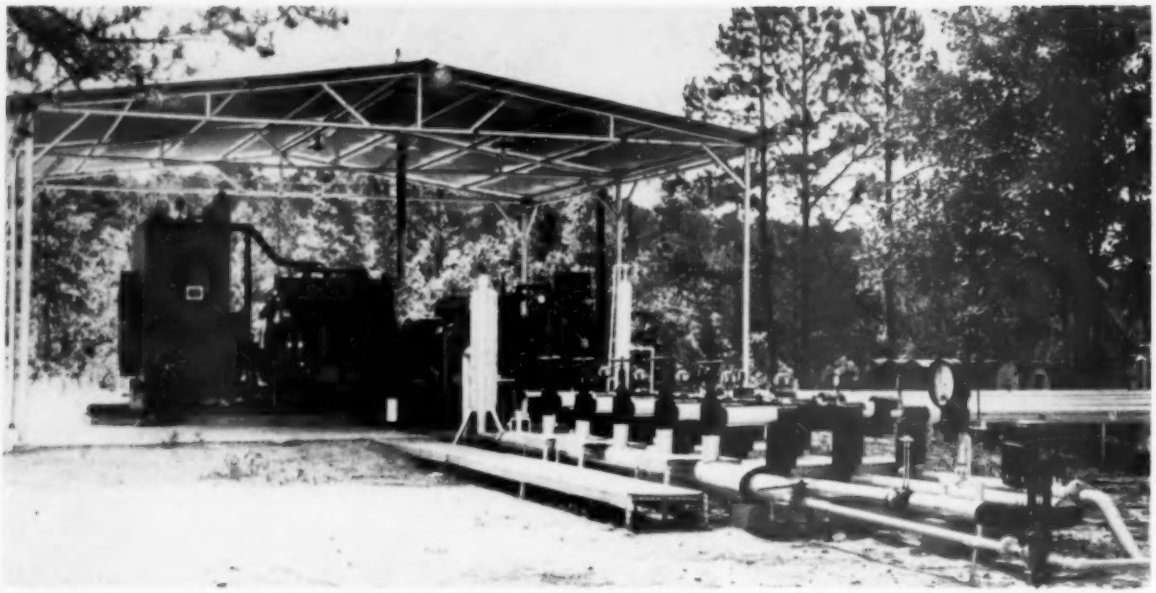
Others agree with the view of another major company expert:

"It's a specialized thing. I think we're definitely going to see a very substantial increase in the use of propane or similar products, but it's going to be driven, piston-like,

continued ▸

Special Report

PRODUCTION



COMPRESSOR pumps 950,000 cu. ft. of air daily into the injection well on Southworth & Wood's fireflood test in East Texas.

by something that doesn't cost as much money to put underground.

"That solvent costs plenty of money. Theoretically, you're going to get it back, but when you look at the time required to get it back, you're limited as to the quantity that can be used."

Thermal recovery still is promising, but unproved, as a working proposition. To some it is simply a "glamor" development of dubious value; to others, possibly an ultimate answer; to most, probably a useful process with limited application.

"Way down the line, I can't help but believe that we're going to see an increasing application of heat in removing all of the oil from a reservoir," declares the chief engineer of a large production division in one major company. "But, as we see it right now, the use of that method is going to be rather slow."

On the other hand, publicity about "fire floods" is just "baloney" to another chief engineer. He sees it as "just a good public relations move, which is a fine thing for the newspapers to write up."

"Anybody who thinks about it," he says, "can realize that it costs a hell of a lot more to put a compressor out there and burn stuff in the ground than it does to put a pump out there and pump water into the ground—as long as you have plenty of water."

Nevertheless, he concedes "a limited application" for the process, because it can move viscous crude that can't be moved by water.

But the most general view among production men today is expressed this way by an official of another major company:

"We're just starting on it, and we've kind of studied what others have done. It looks as if it's going to be a very good tool for certain applications. But it will be limited. And it looks to us as if the principal application will be viscous oils."

The use of heat for recovery is being tested, and projects now going should help settle the question of its value.

There is much that isn't known about the use of heat—and especially heated air—on crude in place.

"I spent considerable time just researching literature on thermodynamics," comments one engineer charged with planning a heat-drive program. "I wanted to find out what changes would take place in crude subjected to heat. But there was very little I could find of direct use in this application.

"You'd think the mathematics would be worked out, at least, but it isn't. We've had to do our own pioneering all the way."

The projects now under way are supplying at least some of the answers. The results of most of these programs, however, are being kept under wraps.

Some of the answers on thermal recovery are coming from a pilot fire-flood project in East Texas, which went into operation only a few months ago.

Southward & Wood, of Houston, is conducting the 10-acre pilot project in Anderson County (page 22).

Although the project has been in operation only since April of this year, engineers already have drawn some conclusions regarding thermal recovery as a whole.

According to the engineers, a key factor in the economics of thermal recovery is the type of residual left as the crude is driven out. The residual is what is burned to keep the process going. There must be enough left to burn, and it must contribute enough heat. And if too much residual is left, the process will be uneconomic, because

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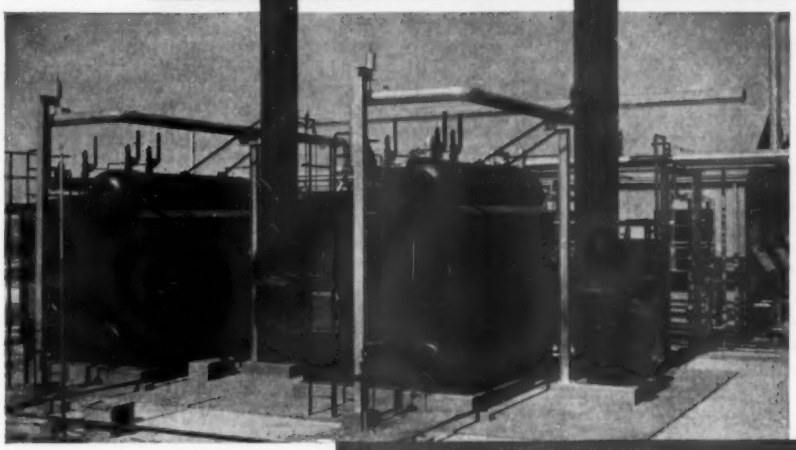
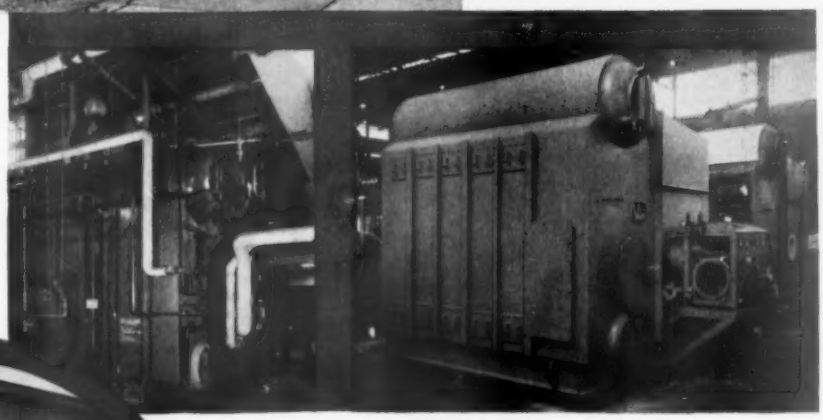
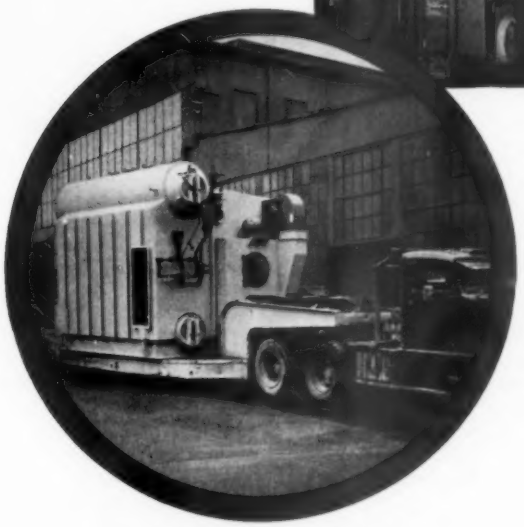




Above: Two units serve a gas pipeline company.

Left: Installation in fibre box-board plant.

Right: Unit for a leading soap manufacturer.



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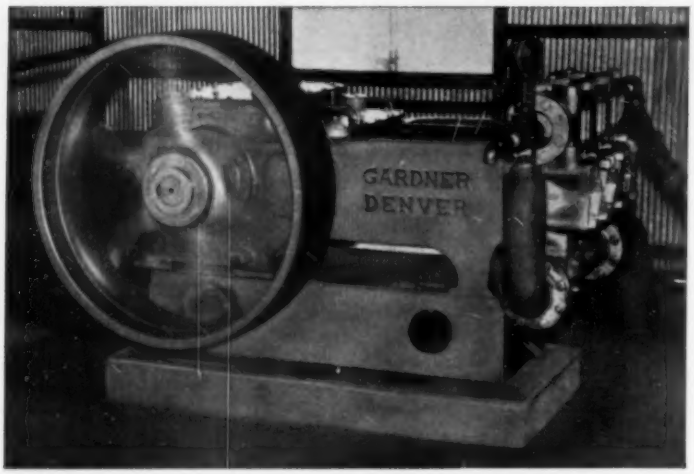

Gardner-Denver PE-5 triplex plunger pump on waterflood project.

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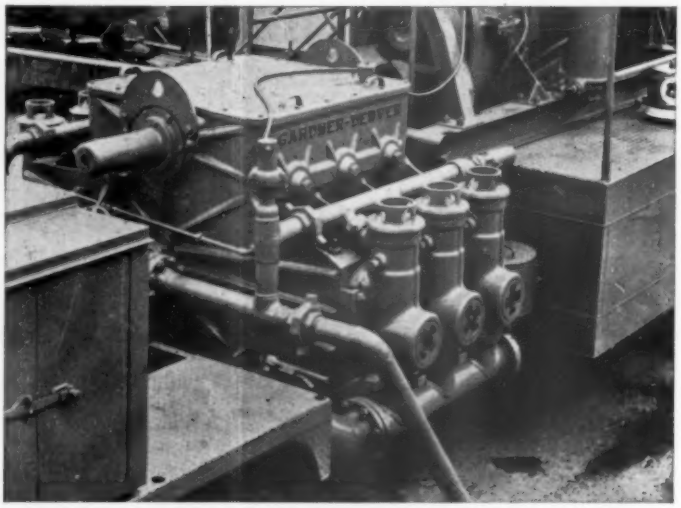

Gardner-Denver PL-7 6-cylinder plunger pump on well servicing truck.

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M. S. PATTON, JR. (seated), and T. P. Harris, of Sunray Mid-Continent Oil Co, check report on one of company's 33 waterfloods.

too much of the oil in place would be burned, rather than recovered.

This project differs from other thermal recovery projects in that the crude is burned by the injection of superheated air, not by the use of actual flame.

The stronger interest in greater recovery of oil already discovered is apparent throughout the oil country. The Rockies area is one that is registering a sharp increase in supplemental recovery programs.

Operators are particularly active now in Colorado, where there had been only one small secondary water injection project prior to last year.

Since mid-1957, however, secondary recovery programs have been started in six of the state's fields, with an expected additional recovery of approximately 470-million bbl. above the estimated 392-million bbl. of primary production for those fields.

Four of the programs are straight waterfloods; the other two, including the largest program involved—Rangely—are combination gas injection and waterflood.

Two additional waterfloods are now being added: (1) Continental Oil Co.'s Little Beaver East unit, with primary recovery estimated at 2.3-million bbl. and additional secondary recovery at almost 2.4-million bbl., and (2) the Kejr field, with an estimated primary recovery of 721,550 bbl. and secondary recovery at another 1,184,610 bbl.

A. J. Jersin, director of the Colorado Oil & Gas Conservation Commission, says secondary recovery studies have been made on "at least a half-dozen" more fields.

"The peak of oil production for Colorado was reached in mid-1956 at almost 170,000 b/d," Jersin adds. "We are producing approximately 135,000 b/d now.

"It would be safe to assume that more secondary recovery projects will be commenced in Colorado at an increasing rate in the near future, because Denver Basin oil reservoir information is only now becoming sufficient to determine whether such projects are feasible."

In western Nebraska, two waterfloods and a gas repressuring project are under way, with at least two additional supplemental recovery programs scheduled. There is a possibility that programs such as the waterflood in the Goodwin field, with just two producing wells and one injection well, may set the pattern for many small-field programs in the area.

continued ▸

Special Report
PRODUCTION

In North Dakota, a secondary recovery program may double the ultimate production in the Beaver Lodge-Tioga (Madison) field (PW—Jul.4'58,p25).

Although eastern Kansas waterfloods now are on the decline, waterflooding is on the upswing in western Kansas.

The eastern Kansas programs, involving the Bartlesville sand primarily, are generally of the large, unitized variety. In contrast, those in the western part of the state tend to be of the individual-lease type.

"The number of applications for waterfloods now is higher than it was a year ago because of this shift toward more but smaller projects in deeper formations," says John P. Roberts, assistant to the conservation director, State Corporation Commission.

"But the acreage involved and the barrels of oil produced are declining."

About half of the supplemental recovery programs in Arkansas have been initiated within the past three years.

There now are 15 secondary recovery programs in Arkansas—12 waterfloods and 3 combination gas-water injections.

"The . . . projects have been estimated to have an added recovery of approximately 100-million bbl. of production," observes George Holden, director of the Arkansas Oil & Gas Commission.

"The success enjoyed by these operations undoubtedly will cause others to want to undertake similar operations."

The count continues to rise, too, in Oklahoma, Louisiana, Texas, and New Mexico.

As of Apr. 1, Oklahoma Corporation Commission records listed 651 supplemental recovery programs, accounting for about 20% of the state's oil production.

Here, too, the smaller type waterflood apparently is in the ascendancy, with operators evidently feeling the large programs are "an expensive gamble."

As of the beginning of June, this year, Louisiana records showed secondary recovery or pressure maintenance programs active in 52 fields and 153 reservoirs (one field, alone, accounting for 14 reservoirs).

Some 27 reservoirs were being waterflooded, 36 gas-injected, 11 gas-water-injected, and 76 gas-recycled.

As of the end of 1956, there were active programs in 134 Louisiana reservoirs. Only 4 projects were started in 1957. But during the first five months of 1958 activity spurted, with 8 gas-injection projects, 4 gas-recycling programs, and 3 waterfloods getting started.

In West Texas, alone, there are 175 active waterfloods, with 17 more proposed, and 42 gas-injection projects, plus 2 miscible-gas programs.

Southeastern New Mexico tabulates 18 active waterfloods, with 3 new ones proposed, along with 4 gas-injection projects and with 2 miscible-gas drives.

Underscoring the supplemental recovery activity in California is the fact that the number of peripheral waterfloods almost tripled between 1955 and 1957.

In 1955, there were 13 active peripheral waterfloods in the state. By 1956 there were 20, and by the end of last year, 34. An even larger total is indicated for this year.

The jump emphasizes the consensus of the industry that secondary recovery programs in California will continue to increase, both in number and importance, as production follows its natural decline curve.

At the same time, pattern waterfloods went down from 11 in 1955 to 10 in 1956, and 9 in 1957.

Combination gas-water projects came to 6 in 1955, and 5 in 1956, then more than tripled—to 16 active—last year.

The number of active gas projects of all types (from pure storage to full pressure maintenance) remained fairly steady—40 in 1955, 44 in 1956, and 40 in 1957.

There are three miscible gas recovery programs in the test stage.

And there have been three in-situ combustion projects in the state during the past three years, all pilot size—in South Belridge field, Kern County; Ojai field, Ventura County; and Midway-Sunset field; Kern County.

Reports are that one of these tests has proved very successful, both from the economic and engineering standpoint.

But in some of the producing states—Oklahoma, Texas, and Louisiana—the picture is clouded by the fact that basic changes in regulations are now being considered.

Some operators definitely are holding off on plans for such programs until they check over any changes in the regulations.

Massena B. Murray, director of the Oklahoma Corporation Commission, recently told PETROLEUM WEEK:

"It is hoped that in the very near future we will be able to publish a proposed set of rules for submission to the industry. These will include rules regarding secondary recovery, and the methods of reporting information believed to be necessary in evaluating secondary recovery projects."

The Texas Railroad Commission is expected, likewise, to make some similar basic decisions before long.

A Louisiana Conservation Commission official told PETROLEUM WEEK, however, that the complex nature of proposals it is studying means that the body's action may be "a long way off."

At the present moment, the commission is receiving and considering industry suggestions on a new proration formula. So far, the type of proration apparently attracting the most interest would be statewide, and on a basis of reserves balanced against costs (economic factor), perhaps on the order of 66% weight to reserves and 34% to costs, but with production not to exceed MER.

REPRINTS AVAILABLE

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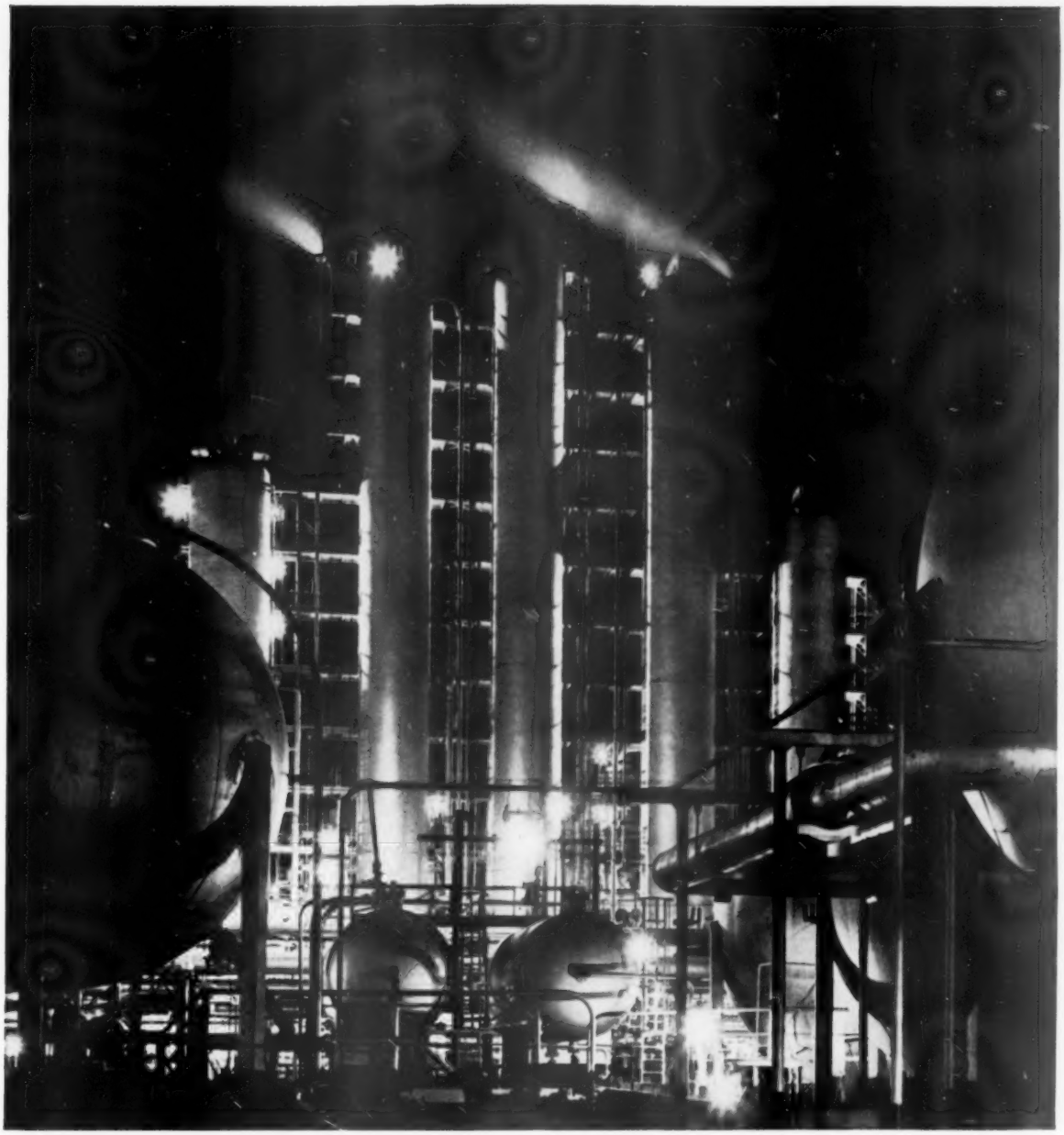

"... the oil industry expanded very rapidly since World War II, and like other industries it is undergoing adjustment and reappraisal. However, nothing in the long-term outlook has diminished our confidence in an expanding future for our industry. The need for our products will grow steadily, and our problems lie in the direction of meeting those needs through the most efficient use of capital and at the lowest possible cost of operations, and not in losing our long-range perspective because of a temporary recession."

—M. J. Rathbone, President, Standard Oil Company (New Jersey)

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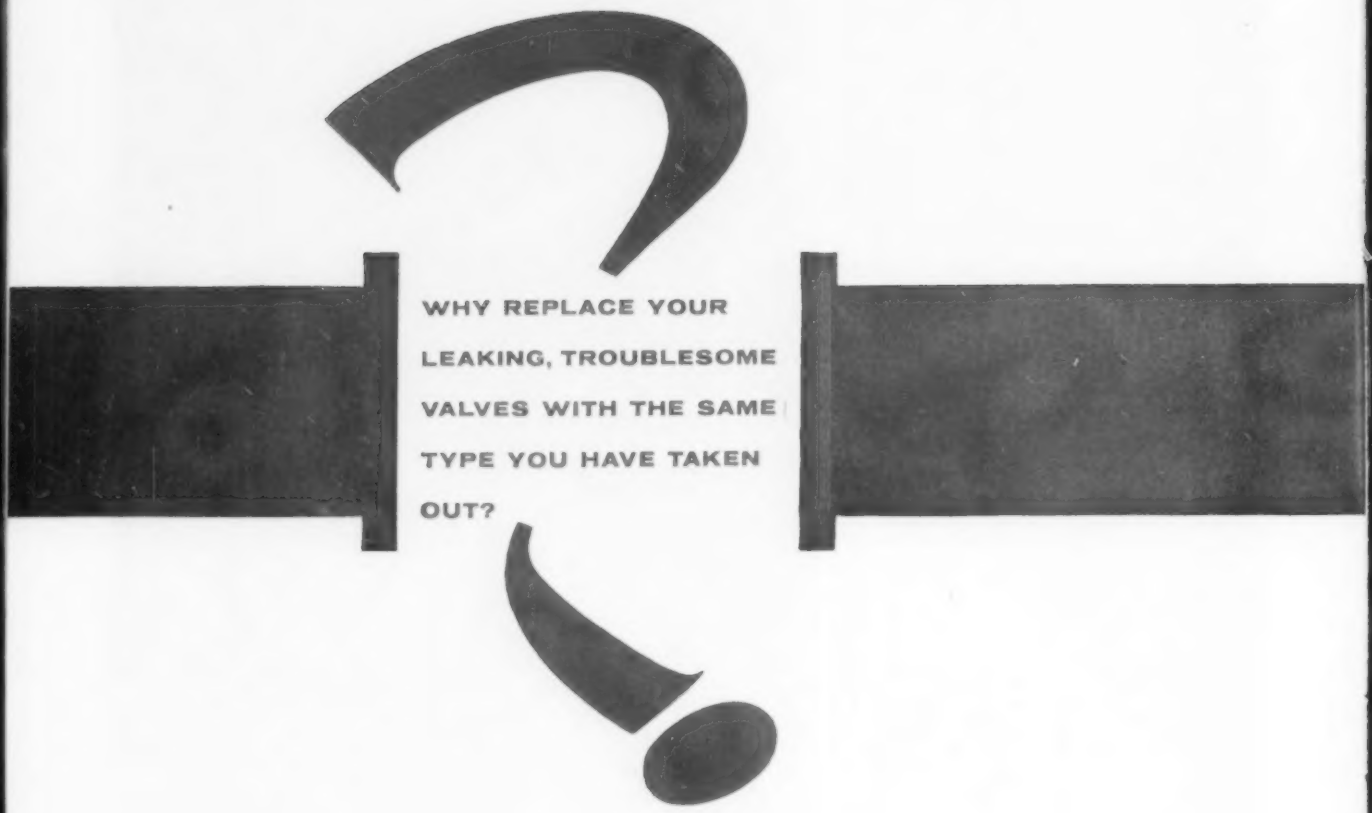
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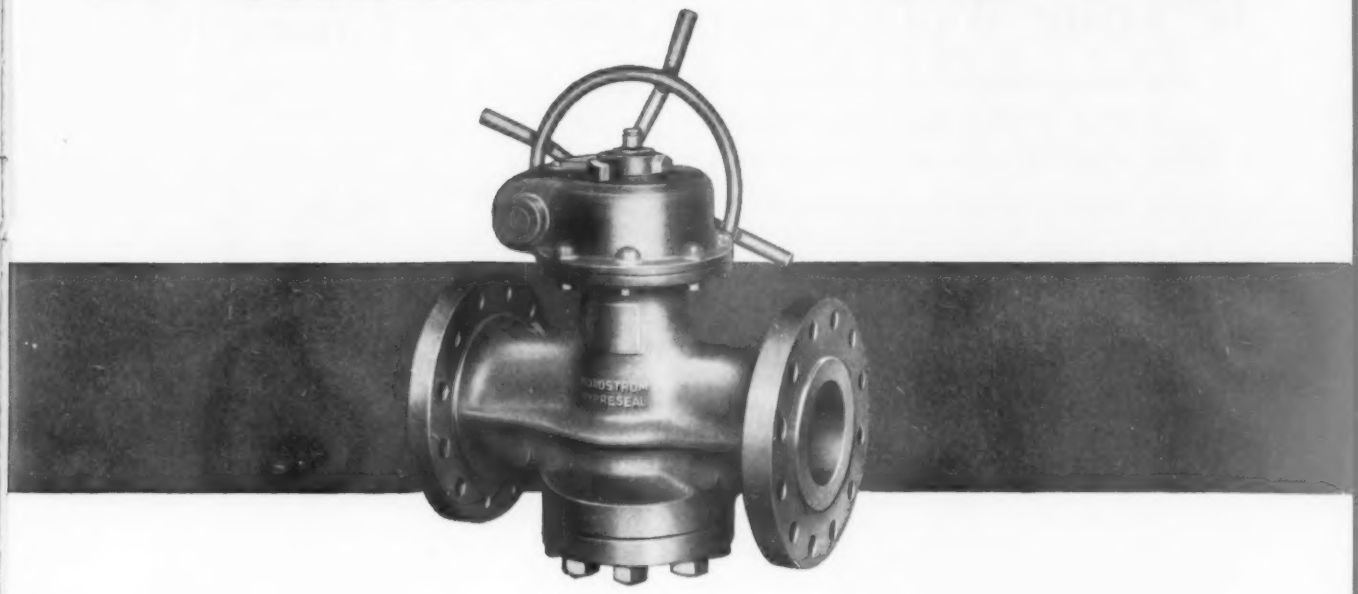
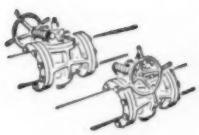
get permanent valve replacement



SPECIFY ROCKWELL-Nordstrom VALVES

Valve replacement programs are costly at best. Why replace your leaking, troublesome valves with the same type you have taken out? Insure permanent valve replacement with Rockwell-Nordstrom lubricated valves.

By replacing with Rockwell-Nordstrom valves, engineers in the gas, oil and process industries have found they can cut maintenance replacement costs *and* get better flow control in the bargain. Here are just a few reasons why they will stay in service longer, work better and cost less to use . . .



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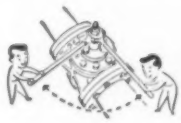

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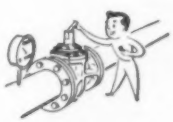

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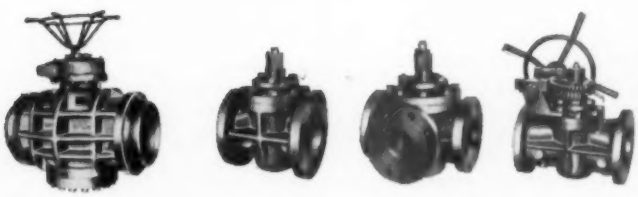

ROCKWELL-Nordstrom VALVES

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MANUFACTURING COMPANY

Is Your Weld Inspection Fast Enough?

New energy sources for radiographic inspection units now make possible many more exposures per day. But they make for some important problems, too.

Progress in pipeline weld-inspection equipment is suddenly moving along at a clip hard to keep up with.

For a long time before World War II, weld inspection was carried out with conventional X-ray machines. But such machines, because they were large and bulky, had to do their inspection job with a minimum of movement along pipeline right of way.

In the postwar years, however, the rapid and extensive development of commercial applications for radioactive isotope made such inspection an easier job. Portable units, using mainly cobalt and thulium isotopes as their energy sources, moved along rights of way inspecting new pipe just before ditching, as well as exposed sections of pipe already in operation.

Radiography units of this type have come into common use for pipeline inspection in the past ten years. But it had one big drawback: Although such equipment was improved gradually during the period, as late as a year ago only three to five inspection pictures a day could be taken by most of the units in use.

Earlier this year, however (PW—Jun.6'58,p38), Arabian American Oil Co. started using a special new radiography unit, which, the company says, can take up to 20 exposures a day. The unit is made by Richardson X-Ray Service Co.

The latest development in such equipment is a German radiography unit that can make twice as many inspections as can be made by the units considered revolutionary only a few months ago.

The German unit, which can take up to 40 exposures a day, was developed by Nord-West Oelleitung GmbH, of Hamburg, which is building a 220-mi., 28-in. crude line between Wilhelmshaven and the Ruhr (PW—May17'57,p52).

Nord-West engineers call the unit the most powerful of its type used to date.

The key to such advances is better use of higher-potency radioactive energy sources.

The German unit, like the one recently put into use by Aramco, uses iridium 192 as its energy source.

The iridium pellets have a shorter half-life than the earlier sources of energy in radiography units, (74 days for iridium, 5.3 years for cobalt-60). But during the time they are usable, they provide a far greater amount of energy than the earlier sources.

Here's how Nord-West is using the unit to get up to 40 exposures daily:

First, 12 or 13 lengths of 40-ft. pipe are welded together and made ready for the inspection.

The iridium capsule is then removed from its radiation-proof lead box and placed in a shielded carrier mounted on a wheeled carriage, in such a way that the capsule is in a dead-center position inside the pipe. The carriage is cranked along the pipe and stopped at the seams.

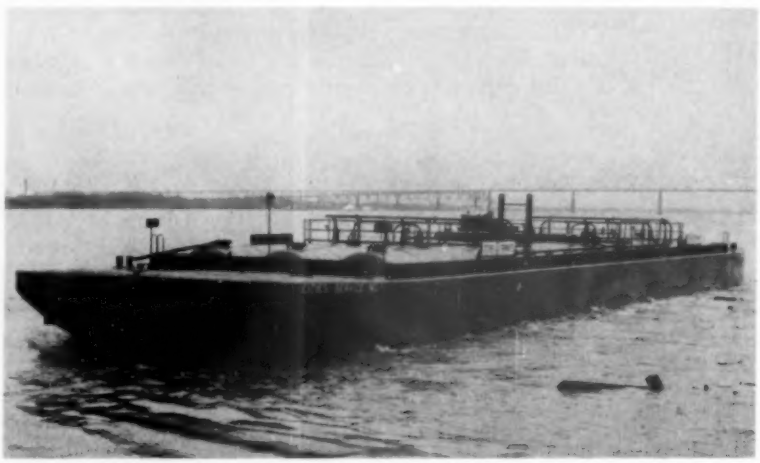
Sensitized paper is wrapped around the outer circumference of the pipe at the welds, and is exposed to the gamma rays from the capsule each time the carriage stops, thereby taking a picture of the weld. A complete weld is "photographed" at each exposure.

The final joint between the already-assembled pipeline and new joint is a bit more difficult to inspect, because the capsule can be used only from the outside of the pipe. An exposure three times longer than exposures made on a pipe section is necessary.

The weld-inspection advances are not without a price, however. With the use of the more powerful energy sources comes the need for more precautions against gamma ray exposure to workers and other equipment.

First of all, heavy shielding has to be provided at the open end of the pipe when the weld inspection is about to take place, to protect the inspection-unit operator.

Also, stringent precautions must be taken for the protection of construction workers and equipment. During the time exposures are being made on the German line, no workers, officials, or equipment are allowed to come near the pipe that is in the process of being inspected.



LPG-Petrochemical Barge Is in Service

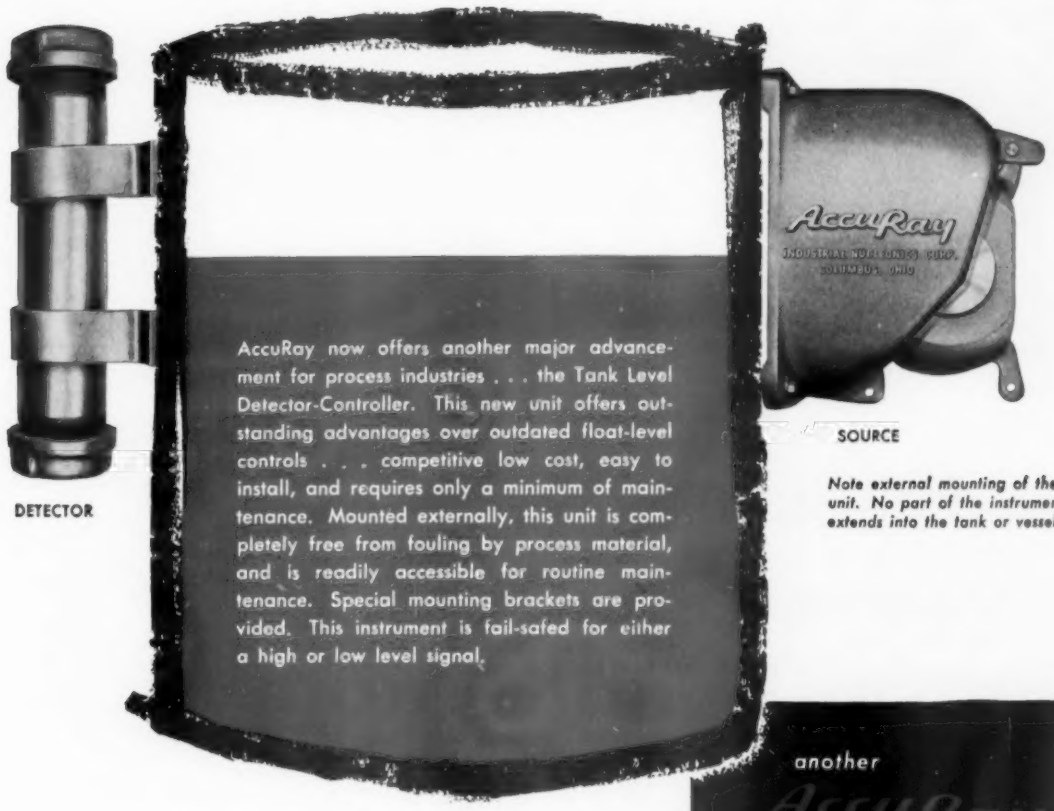
Here's one answer to the growing but still-seasonal need for LPG transportation facilities—Cities Service Oil Co.'s brand new LPG and anhydrous ammonia barge, "Cities Service No. 1."

The barge's six tanks can hold 10,000 bbl. In peak LPG demand seasons, it will be used to carry propane from Cities Service's Lake Charles (La.) refinery to many distribution points along the Mississippi River and its tributaries. It will also be used in Gulf Coast service. On return trips, the barge is expected to carry butane to the Lake Charles plant.

When the seasonal LPG demand ebbs, "Cities Service No. 1" can be used to carry anhydrous ammonia from a Lake Charles petrochemical plant upriver.

If necessary, the new barge can move the LPG and ammonia at the same time. It was built by Avondale Marine Ways, Inc.

AccuRay TANK LEVEL DETECTOR-CONTROLLER



DETECTOR

SOURCE

Note external mounting of the unit. No part of the instrument extends into the tank or vessel.

AccuRay now offers another major advancement for process industries . . . the Tank Level Detector-Controller. This new unit offers outstanding advantages over outdated float-level controls . . . competitive low cost, easy to install, and requires only a minimum of maintenance. Mounted externally, this unit is completely free from fouling by process material, and is readily accessible for routine maintenance. Special mounting brackets are provided. This instrument is fail-safed for either a high or low level signal.

another AccuRay advancement for process control

The AccuRay Tank Level Detector-Controller can be used in two ways. It can be installed horizontally to provide a relay closure signal when the level rises above or falls below the level of the detector; or it can be installed vertically so that both a high level and a low level signal can be provided from one instrument. Accuracies can be maintained to plus or minus 1/16". The radiation source is installed either opposite the detector on the tank, or across a chord of the tank. The design of the source housing provides more than adequate shielding. Design of the instrument is in accordance with accepted standards for both explosion-proof and weatherproof operation.

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TRANSCONTINENTAL GAS PIPE LINE CORPORATION

Watch Canadian NGL Line

"All-Canadian" is the magic label that could transform a vague proposal made early this month to build a natural gas liquids pipeline from Alberta to the Pacific Coast into a reality.

The line—which would link "present and future Alberta gas fields" with Pacific Coast and world NGL markets—was proposed by Foothills Products Pipe Line, Ltd., itself a rather mysterious new firm "sponsored" by Pembina Pipe Line, Ltd., and Mannix Co., Ltd.

Foothills said the line would cost $80-million, but would add "$300-million to $500-million" to the Western Canadian manufacturing economy (PW—Jul.11'58,p28).

The proposal comes at a time ideal for any "all-Canadian" project—a time when Canadian cries against "U.S. domination of the Canadian mineral industries" are at their peak.

Canadian spokesmen from Prime Minister John Diefenbaker on down have been playing the "Canada for Canadians" theme in increasing volume during the past few months. And many observers feel that President Eisenhower's virtual refusal to alter any of this country's economic policies toward Canada in his speech before the Canadian Parliament last week didn't help the situation at all.

Under these circumstances, it is felt, Canadian provincial and dominion officials may look with more favor on any Canadian sponsored plans to develop the nation's national resources.

Of course, any such plan will need hard and fast economic justification as well. But the proposed line's backers says they can present this, too.

Foothills says plans for its line are based on "many months of research and engineering . . . covering the feasibility of the line, design, route, location, and economic studies."

Although Foothills has parried all further questions about the line with a "wait till later" attitude, it is expected that the system's mainline would begin in the southwest corner of Alberta, run through the Crows Nest Pass area on the Alberta-British Columbia border, and terminate in lower British Columbia.

The 500-mi. line is expected to be 12 to 16 in. in diameter.

Formal application for government permission to carry out the project has not yet been made.

Foothills is in discussion with Shell Oil Co. of Canada on the line, and has the National Research Council of Canada and other research centers carrying out related technical studies.

The fact that Shell of Canada may come into the project became clear when it was learned that special studies on moving sulphur by pipeline are now under way for Foothills. Gas from the Okotoks field, where Shell has large holdings, contains a high percentage of sulphur.

The proposed line might even serve as an important feeder for transoceanic movement of LPG.

Japan has long been interested in importing large quantities of LPG, and only recently asked the Canadian Petroleum Assn. for information on the availability of Canadian LPG for such shipment (PW—Jul.4'58,p27).

Gas Has a Good Week at FPC

The Federal Power Commission handed down several approvals of natural gas plans last week.

• Texas Eastern Transmisison Corp. received FPC permission to acquire and operate the natural gas facilities of two of its subsidiaries—Texas Eastern Penn-Jersey Transmission Corp. and Wilcox Trend Gathering System, Inc.

Penn Jersey's facilities include about 263 mi. of pipe and 70,000 compressor horsepower, all in Pennsylvania and New Jersey; Wilcox's facilities include about 389 mi. of line and 6,400 compressor hp. in Texas.

• An FPC examiner authorized the $167-million expansion program of Transcontinental Gas Pipe Line Corp. The largest of projects in the Transco expansion is construction of about 556 mi. of transmission line and 38,580 compressor hp., as well as purchase of 345 mi. of laterals in Louisiana, Texas, and offshore Louisiana.

• Transco also received FPC permission to build a relatively small amount of natural gas transmission facilities needed to carry from the Gulf Coast, on a for-hire basis, gas belonging to Virginia Electric & Power Co.

You find Gates Hose where anything flows

St. Lawrence Seaway — one of the biggest construction jobs in the world — employs thousands of feet of Gates Type 19B Hose. Shown here is Long Sault Dam.

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Gates Industrial Hose

Made in a Full Range of Types and Sizes

What's New / IN TRANSPORTATION

Trans-Canada Pipe Lines, Ltd., will buy—instead of lease—the northern Ontario section of its line, the section from the Manitoba border to Kapuskasing in northern Ontario, which is being built by Northern Ontario Natural Gas Co., Ltd.

C. S. Coates, president of Trans-Canada, said last week that expansion of Trans-Canada's eastern markets, greater and earlier than originally expected, has made it necessary for his company to buy the Ontario section of the line early.

•

The Portsmouth (N. H.) harbor may be able to handle large tankers soon, thereby making possible a change in New England product supply patterns.

The S.S. Mobilgas, a 27,000-ton tanker operated by Socony Mobil Oil Co., recently became the first vessel of its size to negotiate the Portsmouth harbor successfully.

Recent harbor improvements and carefully laid plans, Socony says, were largely responsible for the success.

However, in order to get in, the tanker also had to discharge about 15% of its cargo at another terminal enroute from Texas.

But Socony's general manager of marine transportation, Parker Wise, says that "now that we have succeeded in this first experiment, we will attempt gradually to increase the size of the cargo until we can bring in the larger ships fully loaded."

The entry by the Mobilgas means that Portsmouth will be supplied by large tankers rather than by a barging operation.

•

Trans Mountain Oil Pipe Line deliveries averaged 82,417 b/d in June. July deliveries are expected to average 92,000 b/d.

•

The Interstate Commerce Commission is weighing a suggestion that it approve truck shipments of nonexplosive petroleum products in rubber tanks inside trailer vans.

The proposal was made by Northeastern Truck Co., Charlotte, N.C. The rubber tanks would be both collapsible and removable.

•

Montana-Dakota Utilities Co. is looping its gas transmission line between Laurel and Billings, Mont.

The line carries gas from the Elk Basin, Garland, Byron, and Worland fields in Wyoming to Laurel and Billings. J. W. Albrecht Construction Co. is handling the $500,000 looping program for Montana-Dakota.

•

Storage of crude and products in underground salt formations is finally getting to Russia.

The Russians, announcing plans to use underground storage for petroleum products, say that such storage can "eliminate losses through evaporation, remove risk of fires and explosions, and mean a great saving."

They're right, but a bit late: Underground storage capacity for petroleum products in the U.S. now totals about 30-million bbl., most of it in washed out salt caverns.

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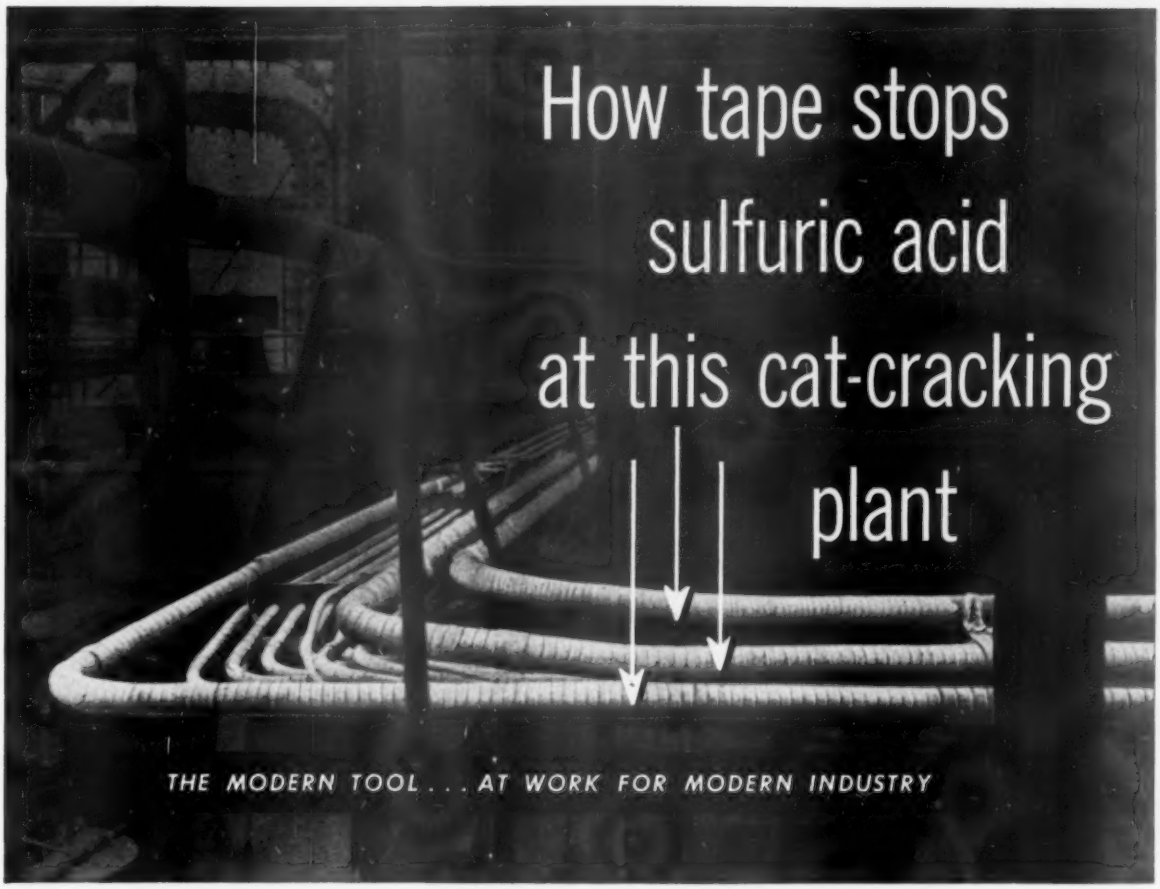

FIVE YEARS UNDER THESE HIGHLY CORROSIVE CONDITIONS PROVES THAT POLYKEN PROTECTION WORKS . . . *TO TRIM COSTS*

Look in on one of the world's largest fluid catalytic cracking units. A maze of conduit and pipe exposed to an extremely corrosive sulfuric acid atmosphere.

Formerly, these structures had to be painted every three or four months. Maintenance costs were excessive. Then, five years ago, they were wrapped with Polyken Protective Tape Coating. They have needed practically no attention since.

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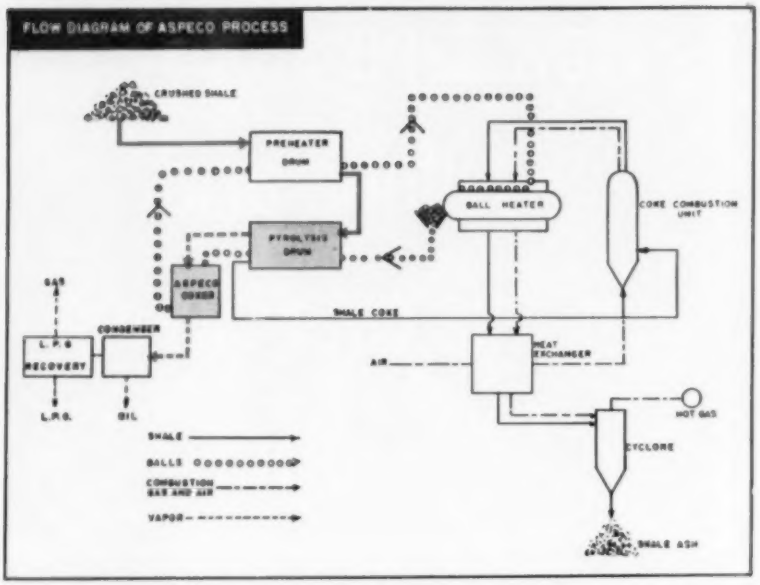

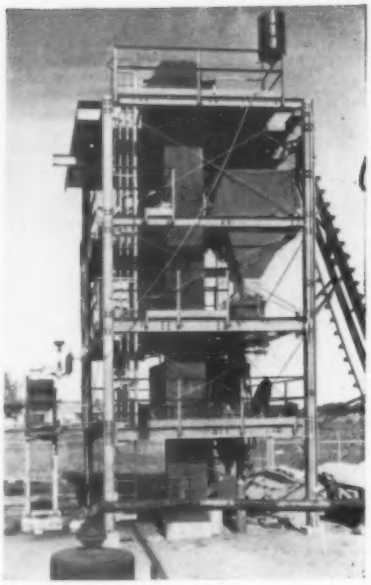

THE ASPECO SHALE OIL PROCESS (left) has been tested in a 24-ton-a-day pilot plant (right). Now . . .

Denver Research Institute says . . .

Shale Oil Is Commercial Today

Shale oil can now compete commercially with domestic crude, according to Oil Shale Corp., holder of Western Hemisphere rights to the Aspeco shale oil process.

This prediction is based on a two-year study with a 24-ton-a-day oil shale pilot plant by Denver Research Institute, under contract to Oil Shale Corp., of Carson City, Nev.

Both institute and company spokesmen feel that the basic process first developed by Olof Aspergren, Swedish engineer, has been improved enough so that liquid fuel can be made from oil shale at costs competitive with those from domestic crude.

Denver Research Institute says that the cost of retorting (heating oil shale to get shale oil) by the Aspeco process is as much as 50% lower than those disclosed for any other process to date.

Confident of its process, Oil Shale Corp. is arranging to build a $3-million semicommercial shale oil plant in the near future.

This plant will process 1,200 to 2,400 tons a day of oil shale to produce about 1,300 to 2,600 b/d of shale oil. As now planned, the plant will be one unit of a proposed full-scale commercial plant, to consist eventually of 8 to 16 such units. Location will be at the company's oil shale deposits in Colorado.

Heart of the Aspeco process is a horizontal rotating kiln, in which the organic kerogen in oil shale is decomposed into shale oil by direct contact with heated balls made of metal or refractory material.

Crushed oil shale is heated to a temperature of about 1,000F in the

What Shale Oil Is

Shale oil is a thick hydrocarbon derived from oil shale. Oil shale is a combination of marlstone (a cousin of limestone), sandstone, and kerogen (a yellow wax-like substance composed of hydrocarbon compounds).

Kerogen is not chemically combined with the marlstone, but is intimately mixed with it. It is presumed that kerogen is composed of prehistoric vegetable matter, and that it was deposited with the marlstone millions of years ago at the bottom of what was then a fresh-water lake.

When oil shale is heated, the kerogen is decomposed and converted into a liquid called shale oil. In composition and characteristics, it is closer to coal tar than to petroleum. But it can be treated by known refining methods to yield products such as gasoline, jet fuel, heating oil, and others.

Oil shale is known to exist in at least half of the 49 states, as well as other areas of the world. The largest deposits in the United States are located in northwestern Colorado and in nearby Utah and Wyoming. The U.S. Geological Survey estimates reserves of 1.5-trillion bbl. of shale oil in Colorado alone.

The richest deposit of oil shale in Colorado is the Mahogany Ledge, in the Green River formation, estimated to contain over 200-billion bbl. of shale oil.

Photograph courtesy of Standard Oil Company (N. J.)

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You can get 25% greater production from a pipe still when you install a Ljungstrom® Air Preheater. An Air Preheater can raise combustion air temperature as much as 1,000 F by recovering waste heat from the still exhaust. The increase in combustion air temperature permits an important increase in the output of your still per barrel of fuel consumed.

For example, at one East Coast refinery the installation of a Ljungstrom increased the capacity of a pipe still from 16,000 to 18/20,000 barrels. At this same refinery, the installation of a Ljungstrom, together with modern fuel-burning equipment, gave finer product control which boosted product ratings an average of 2 octane numbers for an added annual income of $58,000.

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For more complete details on what the Ljungstrom Air Preheater can do for you – for an analysis of the heat recovery benefits attainable in fuel-burning equipment – call or write The Air Preheater Corporation.

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The Ljungstrom operates on the continuous regenerative counterflow principle. The heat transfer surfaces in the rotor act as heat accumulators. As the rotor revolves, the heat is transferred from the waste gases to the incoming cold air.

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Left to right: carbon dioxide trigger, carbon dioxide squeeze valve, 2½ gallon foam, 2½ gallon pressurized water, 20-pound pressurized dry chemical, 20-pound cartridge-operated dry chemical, 2½ gallon pump tank, one quart pressurized VL. Also 1 gallon pressurized VL and 1 and 1½ quart pump VL.

Kidde hand portables are designed to knock fires out *fast*, come in a variety of types and models. The Kidde line includes carbon dioxide extinguishers with fast-acting trigger release or squeeze-valve release in capacities of 2½ to 20 pounds. Kidde dry chemical extinguishers can be had in pressurized models of 5, 10, 20 and 30 pounds capacity, and in cartridge-operated models of 20 and 30 pounds. Kidde wet chemical extinguishers (foam, soda-acid) are available in 2½ gallon bronze or stainless steel models, including cartridge-operated and pressurized water or water-anti-freeze units. Kidde vaporizing liquid extinguishers come in pump capacities of 1 and 1½ quarts, pressurized in 1 and 1½ quarts and 1 gallon. Kidde pump tank extinguishers, in steel or copper shells, are available in 2½ and 5-gallon sizes.

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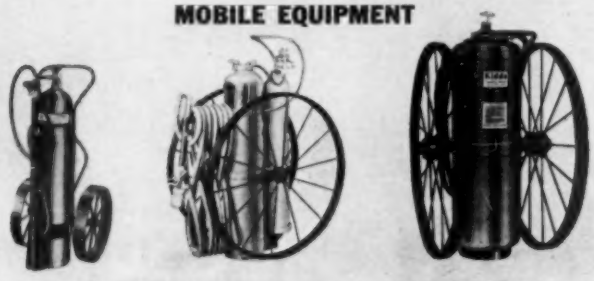

Left to right: 100-lb. carbon dioxide, 150-lb. dry chemical, 40-gal. foam. Also 40-gal. soda-acid.

For major fire hazards, get a mobile unit. Wheeled carbon dioxide units are available in 50, 75, and 100-pound capacities, in one cylinder. Shut-off valve located at nozzle gives operator complete control. 150-pound dry chemical unit has straight stream for long range... fan pattern for wide coverage. Single-lever control for "on," "off," "fan," or "straight" discharge pattern, 50 feet of hose. 40-gallon wheeled foam unit delivers more than ten times its liquid content capacity in fire-smothering foam. Ideal protection against flammable liquid fires. All give expert results even with inexperienced operator.

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Kidde carbon dioxide extinguishing systems are individually designed to fully protect even the most dangerous hazards, use pneumatic control heads to insure instant and complete carbon dioxide discharge. Directional valves afford protection to more than one hazard using the same bank of cylinders. All operating parts are self-enclosed for safety. Visual indicators show at a glance if system is "set" or "released." Thermostatically-operated systems, and package systems for 6000 cubic foot flammable liquid hazards are available.

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absence of air to crack the kerogens. At this temperature, most of the kerogen in the shale is converted into oil vapors and gases, the remainder being coke.

Shale oil vapors and gases are withdrawn from the kiln for further treatment, while residual shale with some coke and the heated balls are discharged from the kiln and separated on a screen.

Over three-fourths of the organic matter in the shale is converted to liquid and gas. The rest becomes a solid coke on the spent shale.

About two-thirds of the organic kerogens becomes liquid shale oil. About 10% becomes gas—around one-quarter of which is recoverable as LPG. The rest is converted into coke.

Liquid product from the kiln has a high pour point, and might require coking before it can be transported from the plant by pipeline.

The oil as it leaves the retort has a gravity of 20 degrees API and a pour point of 70F to 80F. It also contains 1.6% nitrogen and 0.7% sulfur. By coking in a refinery-type coker, however, the pour point is reduced to 20F to 30F.

Preliminary tests by Denver Research Institute show that the uncoked oil can be pumped through a pipeline at temperatures down to 30F. However, the subject is being studied further.

Gas from the kiln, with LPG removed, can be treated further, and then used as a fuel or sold.

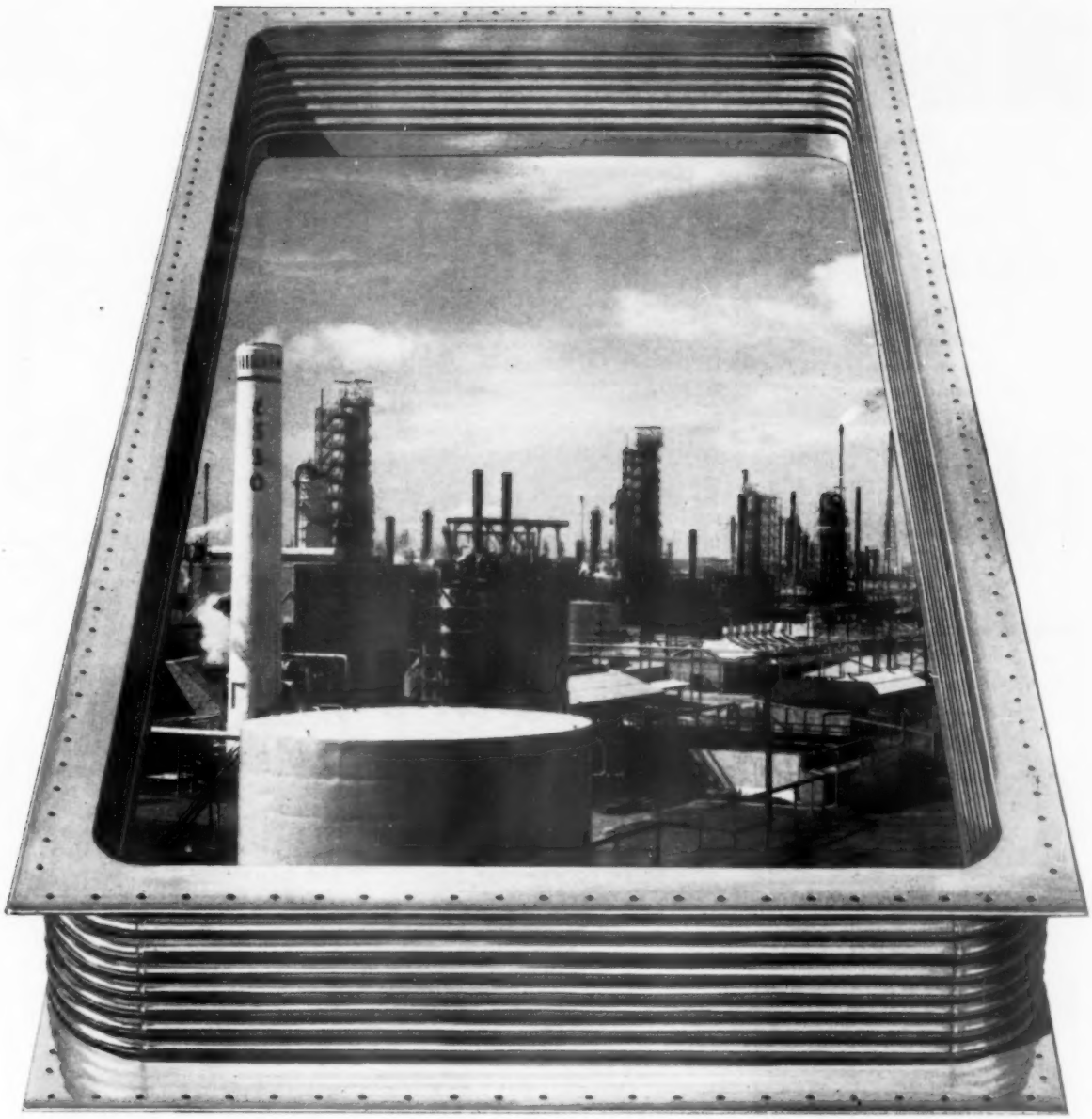
Gas from the kiln contains about 30% carbon dioxide, 25% hydrogen sulfide, and 43.4% LPG and light hydrocarbons. Removing the LPG by refrigeration and the carbon dioxide and hydrogen sulfide by conventional means leaves a residue gas with a calorific value of 700 to 1,000 Btu. per cu. ft. This gas could be used as a fuel in the plant, or sold.

Coke deposited on the shale during retorting is burned to reheat the Kiln balls before recontacting them with fresh oil shale in the kiln.

The balls are heated without direct contact with the burning coke, thus preventing air or combustion gases from being entrained and carried into the kiln. This in turn prevents these gases from degrading or diluting the vapor and gas products from the kiln, according to Oil Shale Corp.

When burned, the coke produces 922,000 Btu. per ton of coked shale. This is more than enough to heat the balls, leaving excess heat for power to run the kiln, to mine and crush the shale, or for sale.

Spent shale ash, with the carbon



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burned off, is discarded. Efforts are being made, however, to find uses for this powdery shale ash. Success would further reduce the over-all cost of producing shale oil.

An economic study of a shale oil plant using this process and capable of producing around 10,000 b/d of shale oil indicates its commercial feasibility, according to Denver Research Institute.

The plant would retort 19,200 tons a day of oil shale. This size corresponds to the minimum practical size of room-and-pillar mine for underground mining as determined by the U.S. Bureau of Mines. This is important, because, although some oil shale property can be strip-mined, most will need underground mining.

Assuming a shale that will yield 25 gal. of shale oil per ton, the plant would produce 11,400 b/d of uncoked oil (or 8,900 b/d of coked oil), and 6,320,000 cu. ft. a day of gas. The gas would produce 427 b/d of LPG by refrigeration.

For shale yielding 30 gal. of oil a ton, these figures become 13,700 b/d of uncoked oil (10,700 b/d of coked oil), 7,850,000 cu. ft. a day of gas and 510 b/d of LPG.

For this economic study, the institute assumed that the residual gas would be flared.

Capital investment for the plant would be around $23-million. It would produce a shale oil comparable with low-grade crude at a cost of between $1.42 and $1.92 a barrel.

This investment figure includes crushing, retorting, coking, and recovery of LPG. Operating costs for the plant with shale yielding 25 gal. of oil a ton, range from $1.92 for a 10-year plant depreciation to $1.67 for 20-year depreciation. For shale yielding 30 gal. of oil to a ton, these figures become $1.65 and $1.42, respectively. These cost estimates include mining, crushing, retorting, and pipeling about 800 mi. to Pacific Coast markets, but do not include interest on capital, profit, federal income tax, depletion allowance, or royalties.

What's New / IN PROCESSING

Delhi-Taylor Oil Corp. may put its Port Isabel (Tex.) refinery back into at least partial operation soon.

Delhi's 15,000 b/d refinery was shut down earlier this year as unprofitable to operate at that time. Company spokesmen, however, say that marketing conditions have improved.

•

Farmers Union Central Exchange, Inc., has completed a $3-million modernization of its Laurel (Mont.) refinery.

Included in the program were a 4,400 b/d Unifiner-Platformer unit and a 7,100 b/d distillate Unifiner.

Two other projects started recently are still under construction. They are replacement of the present vacuum distillation unit and enlargement of the refinery shop and store room.

•

La Gloria Oil & Gas Co. has started renovation of its Tyler (Tex.) refinery.

Capacity of the refinery, now 22,500 b/d, will be increased by 20% to 25%. The cat cracker and gas concentration unit will be renovated.

Cost of the project will be $2-million, with completion scheduled for October. Brown & Root Construction Co. will do the work.

•

Fluor Corp., Ltd., and Foster Wheeler Corp. are reportedly talking about merging.

The talks are still in a preliminary stage. Informed sources believe that the purpose of the merger would be to bolster Fluor's foreign activities and Foster Wheeler's domestic activities.

•

Russia predicts that its output of many important plastics and synthetic fibers will expand ten or twenty fold in five or six years.

As much as $10- to $20-billion will be invested by the Soviets to expand these facilities. Much emphasis will be placed on the production of raw materials, such as ethylene and propylene, and other monomers derived from petroleum and gas.

New processes to make isoprene are reportedly being developed, and research is progressing on methods to produce a nylon based on ethylene rather than benzene.

ABU DHABI'S RULER, Sheikh Shakhbut ibn Sultan (center), with ADMA's T. Hillyard (left) and P. Wainwright (right), hope to see commercial oil established offshore as . . .

Persian Gulf Test Looks Good

The promising wildcat at the southern end of the Persian Gulf off Abu Dhabi has indications of pay in three different formations.

Shows of oil encountered by the test have already stirred hopes that it may establish the Persian Gulf's third offshore oil field (PW—Jun.13'58, p66).

The wildcat is located 20 mi. east of Das Island. It was formerly called No. 1 Adma, but has now been renamed No. 1 Um Shaif. It is the initial test on a 12,000-sq. mi. marine concession held by Abu Dhabi Marine Areas, Ltd., owned ⅔ by British Petroleum Co. and ⅓ by Cie. Francaise des Petroles.

Production possibilities are indicated in—the Thamama, the Arab Zone, and the Darb. The latter has never before been productive in the Middle East.

According to reliable sources, the Thamama (also known as the Yamama) looks the most promising so far, both in thickness of the impregnated formation and the quality of its 36-gravity crude, which is low in sulfur.

Clean oil rose to the surface from an interval between 5,500-800 ft. This is at the bottom of the formation, in the Lower Cretaceous, in soft oolithic limestone showing good porosity.

This has stirred particular interest in industry circles, because the Thamama is unproductive both in nearby Qatar and onshore in Saudi Arabia.

Only one producer has been completed thus far in this formation. This was offshore in the Persian Gulf, 60 mi. northwest, in Arabian American Oil Co.'s recent Manifa discovery, where the Thamama was found "highly productive" (PW—Mar.7'58, p70).

In addition two wildcats drilled onshore in the Trucial Coast states within the past five years had encouraged experts to believe that the Thamama would prove productive offshore in that area.

In 1953, oil was found in this formation, though not in commercial quantities, at Murban, onshore in the Sheikhdom of Abu Dhabi. And last year a wildcat at nearby Shuweihat—though it found water, not oil—showed good bottom hole pressure and porosity in the Thamama.

The new ADMA No. 1 Um Shaif encountered several oil horizons below the Thamama. These were below 7,700 ft. and are expected to correlate with the Arab Zone pays as known in Saudi Arabia.

The well has also had a gas condensate show between 8,190-300 ft. in a formation tentatively identified as the Darb, which is known in Qatar.

The wildcat flowed heavy quantities of gas—between 12-million and 16-million cu. ft. daily—rich in condensate, on each of five drillstem tests made to date.

These tests, all between 7,700 ft. and 8,370 ft., included four in the Arab Zone and one in the Darb. The first was carried out at the top of the Arab Zone in an interval above 7,780 ft., in hard but porous dolomite and limestone. The last, in the Darb, was made between 7,990 ft. and 8,370 ft.

The well is now being drilled below 8,600 ft. toward the Uwainat, which is also known in Qatar. Observers are hopeful of another new oil-bearing formation between the Darb and the Uwainat.

If there are no technical difficulties, the well may be carried to the maximum projected depth of 15,000 ft. in the Permian before it is completed and production tests are made.

Japanese Eye Sumatra Oil Deal

TOKYO—Despite its interest in replacing dollar-oil imports, Japan is hesitant about approving a semi-barter deal with Indonesia involving development of oil from former Royal Dutch Shell holdings in North Sumatra (PW—Jul.11'58,p18).

The proposal has been put forth by Kinoshita & Co., a leading Japanese trading firm. It is dickering with the Indonesian government in conjunction with a group of prospective Japanese investors, including Maruzen Oil Co., an independent refiner.

First word of the plan emerged last week when Kinoshita applied to the Ministry of International Trade & Industry (MITI) for permission to exchange Japanese-built coastal vessels for Indonesian crude. The oil would be developed at the Atjeh field by a joint company to be set up by Kinoshita and the Indonesian government.

The Japanese group would import 10-million tons of the crude over a 10-year period—that is, about 20,000 b/d.

In return for the oil, reportedly worth over $100-million, the Japanese would deliver to Indonesia 66 coastal cargo and passenger-cargo vessels worth $50-million.

They would pay Indonesia in cash and goods over the 10-year period for the balance, apparently after deducting Indonesia's share of costs for developing the Atjeh field.

There are at least three problems to be overcome: First, Tokyo must be convinced that Djakarta has title to

the oil, according to an MITI official.

Indonesia early this year declared the Atjeh field nationalized. But Royal Dutch Shell—which has not had access to it since World War II—has never renounced its claims to the area.

Japan is sensitive to this situation, remembering its difficulties in trying to import Iranian oil following the Mossadegh seizure of Anglo-Iranian Oil Co. properties in 1951.

Japan, badly stung on past trading, also has reservations about a barter arrangement with Indonesia.

Japanese-Indonesian trade has now been put on a cash-and-carry basis. Japan took this position after the Indonesians ran up a textile bill of almost $70-million in open-account trading, then insisted that this be made part of Japan's reparations payments last year.

This could be complicated, since the major international companies are currently Japan's principal suppliers.

Tokyo, however, is interested in the deal's possibilities.

It likes the idea of a source of non-dollar oil imports to relieve the drain on hard-currency reserves. It also favors putting small Japanese shipyards to work on building the coastal vessels Kinoshita would swap.

Actually, Djakarta is not now in control of the Atjeh field, which is held by rebels in Northern Sumatra. However, the central government apparently feels its position sufficiently strong, following its defeat of the revolt in central Sumatra and eastern Indonesia.

According to the Japanese, the Atjeh field is currently producing around 5,000 b/d but is believed to be capable eventually of some 22,500 b/d according to present estimates.

Heavy investment would be required to develop the field. Indonesia, the Japanese say, would pay in oil for its share of the development costs.

Meanwhile, independently of this proposed venture, Maruzen announced this week that it will start importing 20,000 tons of Atjeh crude monthly in August under a six-month contract with Refining Associates Inc., of Long Beach, Calif. A "trial" shipment of 1,700 tons was delivered at the end of May.

The crude—amounting to around 5,000 b/d—will be shipped from the port of Pangkalan Susu. Maruzen said the price is $1.64 per bbl., with a 25¢ brokerage fee.

A Refining Associates spokesman in Long Beach confirmed that the company is already loading the crude, which has been in storage "for some time."

The California firm holds a prime contract to ship crude from Pangkalan Susu, in effect as a broker for P. T. Permina Nasional Indonesia, the government-owned company. Refining Associates is not itself involved in the development-and-barter proposal put forth by the Kinoshita-Maruzen group.

New Date for Arab Oil Congress

CAIRO — The thrice-postponed Pan-Arab Oil Congress is again scheduled for Cairo. It's to be held Nov. 1-15.

Invitations have been sent out by the Arab League Secretariat to all Arab countries, including the Persian Gulf sheikhdoms.

Oil firms operating in the Arab countries have been asked to participate in a Petroleum Exhibition, to be held simultaneously in Cairo. The Congress, originally scheduled for February, 1957, was repeatedly postponed at the request of some Arab governments—notably Iraq, which had insisted that it should be held in the capital of an oil-producing state.

Nasser's United Arab Republic will have a 30-man delegation at the Congress, according to an announcement by the official Egyptian "Middle East News Agency." Replies of others are now being awaited.

The Congress will be split into committees and will discuss the following subjects, according to the Egyptian agency:

- Oil exploration in the Arab world;
- Oil refining and by-products;
- Ways to closer cooperation between Arab states on production, and marketing of oil;
- Petroleum legislation, and "the organization of relations between the oil-producing countries and the foreign operating companies."

Oil experts of the UAR's General Petroleum Authority, and Saudi Arabian Oil Director Abdulla Tariki, are expected to be moving spirits of the Congress.

Both will reportedly press for: an increase in the Arab countries' refining capacity; increased Arab participation in and control of petroleum operations; control and operation of oil transport facilities, and political and financial control of world-wide marketing operations.

What's New

NEUTRAL ZONE—The Japanese expect to start offshore survey work on their new concession next month with a Geophysical Services International ship that's now in Kuwait.

The survey is to be completed by the end of November, a spokesman for Arabian Oil Co. said in Tokyo last week. Depending on results, drilling might be started next spring.

The Japanese company last week was in process of concluding its formal concession agreement with Kuwait on the offshore Neutral Zone. It already holds Saudi Arabia's undivided half-interest.

Arabian Oil currently estimates costs of exploration on the offshore acreage will be $15-million to $20-million, including an annual $1½-million rental payable to Saudi Arabia.

The company now has paid-up capital of $10-million. President Taro Yamashita's first job on return from his present Middle East trip will be to raise additional capital among Arabian Oil's Japanese blue-chip backers.

•

SYRIA—Western companies with oil rights in Syria must now look to President Abdel Nasser in Cairo for any changes in terms of their present exploration agreements, including conversion to development.

Such changes must be made by decrees signed by Nasser as President of the United Arab Republic.

This is ordered in a new decree signed by Nasser. It also orders that all new oil and mineral exploration permits and concessions may be granted only by decrees signed by him.

The Planning Minister for the Syrian province of the UAR had previously announced that all new exploration would be carried out by the government. At the same time, the Syrian-American group that has already found oil in Syria had been assured it would get the development rights it had been denied for the past two years (PW—Apr.25'58,p64). This group is headed by Syrian-American J. W. Menhall, and includes Atlantic Refining, which has a 50% interest, and Portsmouth Steel.

Thus the immediate significance of the new decree is that the Menhall group can now get its development rights only by decree from Nasser.

AROUND THE WORLD

Eventually it would also affect Deutsche Erdoel, a German independent, if and when it finds oil under its exploration permits.

•

WEST GERMANY—Two German independents, which recently expanded capacity of one jointly owned refinery, plan to build a new 30,000 b/d plant to operate on imported crude.

The new $24-million plant will be completed by early 1960 at Lingen. It will be linked with the Wilhelmshaven-Ruhr pipeline being built by a group headed by Esso AG.

The refinery will produce heating oil primarily, and will be built by Gewerkschaft Erdoelraffinerie Emsland, owned 65% by Wintershall AG, 35% by Gewerkschaft Elwerath. Both are domestic producers; both also operate in Peru. Their existing plant, also at Lingen, was recently expanded to 20,000 b/d.

•

BARBADOS—Kerr-McGee Oil Industries, Inc., will receive an undivided 25% interest in Gulf Oil Corp's prospecting license in return for drilling the No. 1 Gulf Morgan Lewis, Barbados Gulf Oil's sixth wildcat on the island.

The wildcat is now below 8,594 ft. near Bellaplaine. It was spudded in March by Kerr-McGee as drilling contractor (PW—Jun.20'58,p56).

The two companies announced last week that the Barbados government has approved an agreement under which Kerr-McGee will receive the 25% interest in Gulf's license, which covers the whole island, when drilling reaches a "certain stage." The well is to be carried to 15,000 ft. if possible.

•

BRAZIL—The stage is now officially set for Brazil's first barter deal for Communist-bloc petroleum and oil-development equipment.

The deal is covered by a one-year bilateral trade and payments agreement signed with Rumania by the Bank of Brazil and the Ministry of Foreign Affairs.

No limit has been placed on total value of the transactions that may be made under the pact, which may be renegotiated at the end of one year. A $10-million ceiling has been set for any trade gap, however.

There is no official indication yet exactly how much oil and oil equipment the Rumanians propose to supply in exchange for coffee, cotton, and other Brazilian products. Their original offer was for 300,000 tons of oil plus the equipment (PW—Jun.13'58,p68).

The agreement, a reversal of policy for Brazil, is the first bilateral trade pact it has signed in two years. It is expected to shape a new pattern for trade agreements with Iron Curtain countries, and eventually with the Soviet Union itself. The latter has already offered to barter 200,000 tons of crude.

•

PARAGUAY—With its first wildcat under way in the Chaco region, Pure Oil Co. is hacking a road through the area's dense quebracho forests toward its second drillsite.

Over-all, Pure and its associates—Gulf, Tidewater, Sinclair, and Williams Bros.—are building over 200 mi. of graded roads.

Pure's first wildcat, which is Paraguay's first in nine years, is located near Fortin Madrejon. It is estimated that the test will be carried to 11,200 ft.

The well is on the 14.5-million-acre concession Pure obtained last year (PW—Oct.11'57,p83).

•

TURKEY—Mersin will be the site of the 65,000 b/d refinery planned for 1962 by a four-company group —rather than Iskenderun. The site has been in doubt for some time (PW—Aug.2'57,p40).

Atas Co., a refining company, has asked for government permission to build its $48-million plant there. The company is owned by Socony, Caltex, British Petroleum, and Royal Dutch Shell.

•

ITALY—Any real hopes of change in the existing domination of private oil enterprise by state-owned oil operations have been dashed by the nature of Italy's new coalition government (PW—May16'58,p14).

The new center-left government, it is felt, is certain to back the continued progress of the government's Ente Nazionale Idrocarburi. At the same time, part of its program provides for encouragement of foreign investment and private enterprise.

An effort to maintain a balance between state and private enterprise is seen in the new cabinet. Prime Minister Amintore Fanfani chose its members from the left, center, and right wings of the Christian Democrat and Social Democrat parties.

The outlook for private oil companies thus is gray at best: no real change in their operating conditions, and they'll have to contend with ENI's increasing stature. It could be distinctly black for private oil enterprise if the new government proves unstable and collapses, in which case it might be replaced by a Communist-Socialist popular front.

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WEST GERMANY—The booming growth rate of oil demand "leveled off" last year to 11.5% according to West Germany's oil industry association, in Hamburg.

This increase, which brought oil consumption to a total of 14,815,000 tons (about 298,000 b/d), was a sharp drop from jumps of 27.2% in 1956 and 24.5% in 1955. But this year's demand is running well above last year's Suez-depressed level, and is expected to climb by something like 19.5%. (PW—May9'58,p75).

•

VENEZUELA—Hoard Exploration Co., a Houston geophysical contractor, has bought controlling interest in Talon Petroleum for about $4.3-million in cash and properties (PW—Jul.4'58, p36).

Hoard, which had done a seismic survey for Talon last year, acquired 51% of the company from Texas oil man Cecil Hagen.

It is not yet clear whether a group of U.S. independents is also involved in the deal in association with Hoard.

Payment is being made in producing and exploration properties in Texas, Oklahoma, and Canada, plus an undisclosed amount of cash.

Geologist and petroleum engineer Charles Glass, former vice-president of Talon, has been named president of the company.

The new management expects to maintain Talon's 1,500 b/d production in Falcon state, though it plans to reduce its present 95 employees by two-thirds.

It will also continue expanding its La Estacada terminal, which is currently handling 15,000 b/d of crude for Superior Oil.

Still pending is a solution of a deadlock with Venezuelan minority shareholders over $2.2-million due for Talon shares.

The ruling junta recently refused to grant Talon new concessions, and both the government and the minority group had declined to buy out Hagen's interest.

FREE PUBLICITY, such as this book display in a department store window, was one of the dividends already won by the Mobil Guide. But the main question, as yet unanswered, is:

Can a Book Sell 'Gas'?

Magnolia Petroleum Co. dealers are selling a new specialty item—a book titled "Mobil Guide." If it builds station traffic, Socony Mobil will do a national guidebook series.

Magnolia and its parent company, Socony, are testing the effectiveness of the $1 paperback as a marketing tool. The goal is not to make money on the book, but to win new customers.

"If it doesn't build station traffic, it's not for us," says a Socony official, "because we're in the oil business, not the book business."

The "test" guidebook covers Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. It was published in collaboration with Simon & Schuster, Inc. Distribution started in May.

The book highlights oil's growing emphasis on vacation travel—the force behind 10% to 18% of all gasoline sales, according to Socony officials.

A big reason behind this trend is the longer vacation period given by many companies today, enabling employees to travel greater distances.

The airlines and bus companies are pushing automobile travel now, too. They promote long-distance travel by plane or bus combined with "drive-it-yourself" auto tours at the other end.

All oil companies are doing something to promote vacation travel by car. Many are participating in Ethyl Corp.'s "Magic Circle" promotion (PW—Feb.28'58,p42). Most majors have some sort of touring bureau to help motorists plan trips.

A recent trend is to offer credit card customers deferred payment of vacation service station bills. Instead of paying right away for all the gas, oil, and services charged to his credit card while on vacation, the motorist spreads these payments over several months.

Mobil "travel philosophy" is to make every dealer a travel expert—since the service station is a logical place to seek information.

Socony and Magnolia officials feel the guidebook is a natural for an oil company. The first person a stranger in town goes to for information is a service station dealer or a cop, they reason. The book gives the dealer an unbiased basis for his recommendations, even if he never sells a single guidebook.

Mobil Guide is the first guidebook of its type in the U.S. It rates more than 1,500 motels, hotels, and restaurants in the five states where Magnolia markets. It also has sightseeing tips.

The book has been compared by some to the famous Michelin Guide to France, published by Michelin Tire Co. When a French hotel or restaurant establishment wins or loses a top Michelin rating, it's a news story.

The Mobil ratings work this way: (1) Just to be listed a place must be clean, well-managed, and satisfactory in every way; (2) a check mark indicates a good buy; (3) one star—better than average in the area; (4) two stars—very good by national standards; (5) three stars—excellent, worth going out of your way for; (6) four stars—one of the best in the country. Only three motels and one specialty restaurant in the five-state area rated four stars.

In addition to the ratings, the book gives such data as a town's vital statistics, what to see and do, and whether or not such things as babysitters or laundromats are available.

The 330-page paperback is available for $1 at Magnolia stations, and at bookstores, drugstores, department stores, or wherever pocket books are sold.

Simon & Schuster has about 10,000 outlets in the five-state area. About 2,000 Mobil outlets are selling the book. In addition, some 200 Mobil stations on the periphery of the five-state Magnolia area are selling it to test out-of-state sales potential. Stations getting the most highway traffic are the main book-selling stations, while few of the "grocery store" outlets sell them.

The book was nearly three years in the making. Mobil underwrote most of the cost, but left the compiling and editing to the publisher.

Talk of the guidebook first started in the early 1950's, but it wasn't till 1955 that Socony started serious talk with Simon & Schuster.

A research team was picked. Then a one-city test guide of Austin, Tex., was completed. From there, the Magnolia five-state area was picked for the first Mobil Guide.

Keeping the ratings tough, and as objective as possible, has led to a few kickbacks. On occasion, it has meant putting in a plug for competing oil companies.

"We knew we were leading with our chin to rate establishments," says a Mobil official, "but we felt the good will we would win would outweigh any gripes."

Researchers were not allowed to accept even so much as a free cup of coffee from an establishment being checked.

This objectivity carried over to oil—not without a bit of irony. Suggested industrial tours include Esso's Baton Rouge refinery and Texaco's Port Arthur refinery, but overlook Magnolia's big refinery at Beaumont, Tex. One of the top-rated motels has a Gulf tie-in.

Dealer reaction, so far, has been good. For one thing, the book adds to station profits.

Magnolia introduced Mobil Guide with dealer meetings and all the promotion and fanfare given to any new product.

Dealers can return any unsold books. On the books they do sell, they get as good a profit percentage as on any TBA item.

The big thing in selling the books, says Magnolia, is to have them properly displayed.

Travel editor response to the book has already handed the Mobil brand-name many columns of free publicity.

Rave notices—many of them from outside the five-state area—brought requests for similar guides to other sections of the country.

One newspaper was so in favor of the rating system that it wrote "If this goes national, it'll beat Duncan Hines and AAA."

The guide even rated nearly three columns in the Saturday Review.

About 90% of the reviews said the book was on sale at Mobil stations. About 30% actually put the word Mobil in the headline.

A lot of newspapers localized the reviews. One used this headline: "New Mobil Guide Available at West End Service Station."

A leading book reviewer in Dallas reviewed the guide on a Sunday afternoon television program. Magnolia didn't even know about it till it was on the air.

"Rarely have we had as much favorable publicity for any product or service," a Magnolia official says happily.

Bookstores and department stores splashed the Mobil name all over, too, in window displays. Such displays included one in a Fifth Avenue, New York, bookstore, and one in a department store in Hartford, Conn. (picture, page 80).

Mobil Guide is now the top-selling book in the five-state area it represents, and a good seller elsewhere. The first 100,000 copies—meant to last a year—are now expected to be almost sold out by the end of July.

Orders have been phenomenal—out-pacing best-selling novels in some areas. One Dallas bookstore sold 250 copies the first two weeks. Another distributor wired after one week: "You have a winner Mobil Guide. Rush 500 copies."

Even a parking garage sold three dozen copies in three weeks.

"It's certainly a publisher's dream come true," says a Mobil official. "We hope it'll be a station-traffic builder, too."

Mobil sales officials feel they're reaching a brand new audience through recommended establishments that are capitalizing on their "Mobil ratings."

"We're even reaching our competitors' customers, who might never get to a Mobilgas station," says a company official.

Antoine's, in New Orleans, which got a three-star rating, is selling Mobil Guide. Many establishments are using their ratings in promotions, with the tag, "as recommended by the Mobil Guide."

In addition, a large pharmaceutical firm is giving a Mobil Guide to every doctor in the five states. If similar guides are published for the rest of the country, it plans to give copies to every doctor in the U. S.

Mobil officials feel the guide book is economical, compared to its effectiveness. They point to one company's expenditure of more than $300,000 for travel advertisement (including reprints). This is much more money than the guide book cost. Besides, they point out, the guidebook is a sales item so the company gets some money back.

It's fairly certain that Socony will go ahead with the nationwide series.

Providing market tests show an increase in Magnolia station traffic, Socony will do about seven regional guides. Each will probably be revised annually. Simon & Schuster estimates that it would have a minimum of about 85,000 of its book outlets handling a national edition.

Indications are that the guidebook does build station traffic—especially where it's properly handled by the dealer. But it's still too early to tell definitely, says Magnolia.

What's New / IN MARKETING

Another supplier has thrown out competitive price discounts. Phillips Petroleum last week dropped gasoline discounts to jobbers and dealers in Oklahoma.

Phillips' move follows similar action last month by Continental Oil Co. in Oklahoma, and by most refiner-suppliers in Texas. The no-allowance trend is an attempt to stop the price wars that have been sweeping across the Southwest. Suppliers apparently feel it's worth a try, even if prices strengthen only temporarily.

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Possibilities are remote this year or next for a government-launched plan for developing industrial alcohol fuel from farm products.

The Senate Agriculture Committee has a bill to establish an agency to study new uses for farm products—among them, industrial alcohol. However, the Senate bill faces a 50-50 chance of dying in the House. Even if the bill is passed, the backers face another struggle to get money to operate the agency.

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The Oregon Gasoline Dealers Assn. has failed, at least temporarily, in its drive to stop supplier operation of service stations and to prohibit "subsidies" and "dealer aids." The association was unable to get the necessary 38,415 signatures by the July 3 deadline to place the proposition on the November ballot.

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River States Oil Co., Evanston, Ill., has acquired Northeast Oil Co., Minneapolis. The transaction gives River States ten stations in the Minneapolis-St. Paul area.

River States, wholesaler and retailer of finished petroleum products in Minnesota, Iowa, Illinois, and Wisconsin, is a marketing affiliate of Murphy Corp., El Dorado, Ark.

DEPT/Personals

HAROLD MIDTBO has been elected a director of Standard-Vacuum Oil Co., White Plains, N. Y. He will continue as treasurer, a post he has held since 1951. Midtbo joined Standard-Vacuum in 1934, and was appointed assistant treasurer in 1942.

C. R. Watts

H. Midtbo

C. R. WATTS has been named Edmonton division superintendent for Shell Oil Co. of Canada, Ltd. He succeeds **George Cormack**, who will be on temporary assignment in the United States.

ROBERT H. VICK has joined the waterflood division of Ambassador Oil Corp., in Fort Worth, as assistant superintendent and chief engineer of secondary recovery operations. For the past three years, Vick has been manager of engineering and secondary recovery for Graridge Corp., Breckenridge, Tex.

PAUL E. McGOVNEY has been promoted to vice-president of Honolulu Oil Corp., San Francisco. He will continue to manage the company's Canadian operations, and exploration activities in the northern Rocky Mountain division.

WILLIAM D. STUART is manager of the newly established information office of the Canadian Petroleum Assn. in Ottawa. He has been executive assistant to **John W. Proctor**, general manager of the association.

W. D. Stuart

L. F. Moody, Jr.

LEWIS F. MOODY, JR., is chief automotive engineer of Socony Mobil Oil Co., in New York. Moody started with Socony in 1937 as automotive engineer at Paulsboro, N. J., and was most recently senior engineer in the lubricating department, in New York.

JOHN S. STOFFER has accepted an assignment with the Iranian Oil Exploration & Producing Co., one of two operating companies of the International Consortion, in Masjid-I-Sulaiman, Iran. He is division comptroller and services manager for Gulf Oil Co.'s Denver production division. **C. J. Richter** will assume Stoffer's duties as division comptroller, and **W. C. Gallaway** will be services manager. Richter has been accounting manager of the Denver production division since 1956, and Gallaway moved to Denver in 1956, as budget and services manager.

GORDON KIRBY has moved to Calgary as vice-president and exploration manager of Amurex Oil Co., newly acquired subsidiary of Murphy Corp. Kirby has been division manager for the parent company in Billings, Mont.

DAVID B. DAVIDSON, Durango, Colo., has been elected president of a newly established section of the Society of Exploration Geophysicists in the Four Corners area of Colorado, New Mexico, Arizona, and Utah. Four other officers of the new section are: **R. P. Thomas**, Durango, first vice-president; **J. W. Rogers**, Farmington, N. M., second vice-president; **John P. Badami**, Durango, secretary; and **V. Frank Hinson**, Durango, treasurer.

W. D. Seyfried

A. A. Draeger

W. D. SEYFRIED was promoted to head Humble Oil & Refining Co.'s research and development division, at Baytown, Tex., succeeding **A. A. DRAEGER**, who will become manager of general office sales for the marketing department, in Houston. Seyfried has been assistant head of the research and development division since 1948, and Draeger has been manager since 1947. Draeger has served in Humble's Executive Program in several capacities.

ALBERT B. STEVENS, formerly general manager of Farnsworth & Chambers Oil Co., Houston, has purchased the company's producing properties in West Texas. He has established the firm of Albert B. Stevens & Associates, Houston, to operate the new properties and to engage in oil and gas property evaluation and management.

CHARLES M. KITTRELL has been appointed manager of the newly established office for the supply and transportation department of Phillips Petroleum Co., in New York. He was formerly administrative assistant to the manager of the department, at Bartlesville, Okla. **C. M. McCormick** has been named assistant to the manager of the supply division, and **L. A. Whitehair** succeeds him as industrial relations director of the department. Whitehair was formerly administrative assistant to the manager of the pipeline division.

HARRY F. HUF has been named general manager of the engineering and construction department of Atlantic Refining Co., in Philadelphia. Huf, administrative manager of the department for the last four years, succeeds **L. M. Goldsmith**, who is retiring.

H. F. Huf

J. H. Adams

JOHN H. ADAMS has been named southern division engineer for Carter Oil Co., at Shreveport. He replaces **Harry E. Allen**, who has been named assistant manager of the crude oil and gas sales department at Tulsa. **Egon Rohr**, formerly district engineer at Durango, replaces Adams as assistant division manager at Oklahoma City.

T. G. KELLIHER, Tidewater Oil Co., Houston, was elected president of the American Assn. of Petroleum Landmen at its recent annual meeting in New Orleans. Other new officers of AAPL include: **William H. Laird**, Intex Oil Co., Bakersfield, Calif., first vice-president; **Joseph Ware, Jr.**, Union Oil Co. of California, Denver, second vice-president; **Robert M. Garst**, Pan American Petroleum Corp., Midland, Tex., third vice-president; and **Charles G. Cary**, Freeport Oil Co., New Orleans, treasurer.

BOYD GUTHRIE has joined Socony Mobil Co., at Paulsboro, N. J., as a oil shale specialist. He had worked with the U. S. Bureau of Mines' petroleum and oil shale experiment station at Laramie, Wyo., since 1955.

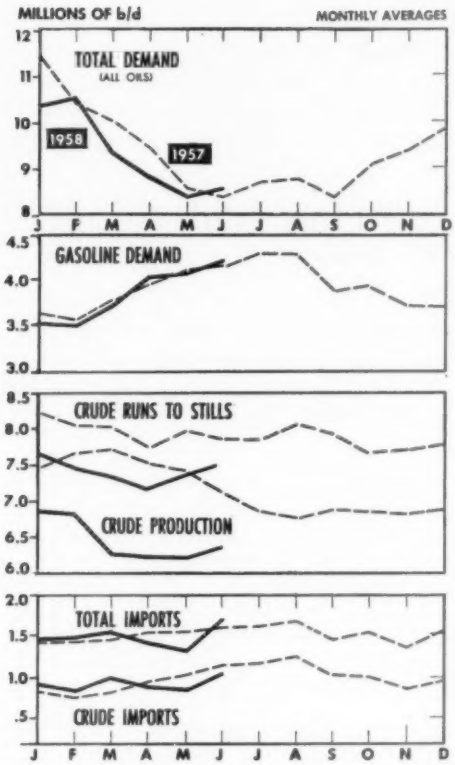
J. M. COURTRIGHT has been appointed eastern division manager of Shell Oil Co. of Canada, Ltd., in Montreal. He was previously manager of purchasing and stores at the company's head office in Toronto.

RALPH Z. MARSH and **DONALD O. HANSON** have joined the production engineering division of Gulf Research & Development Co., Pittsburgh, as research engineers.

JOHN H. FERRY has joined the Denver National Bank as a geological engineer. Most recently he has been a senior staff engineer with the consulting firm of E. A. Polumbus & Associates, in Denver.

PETROLEUM WEEK'S

Fingertip Figures



TOTAL DEMAND

Latest 4-week average	8.574
Year ago	8.762

GASOLINE DEMAND

Latest 4-week average	4.191
Year ago	4.312

RUNS TO STILLS

Latest week	7.607
Previous week	7.461
Year ago	7.972

CRUDE PRODUCTION

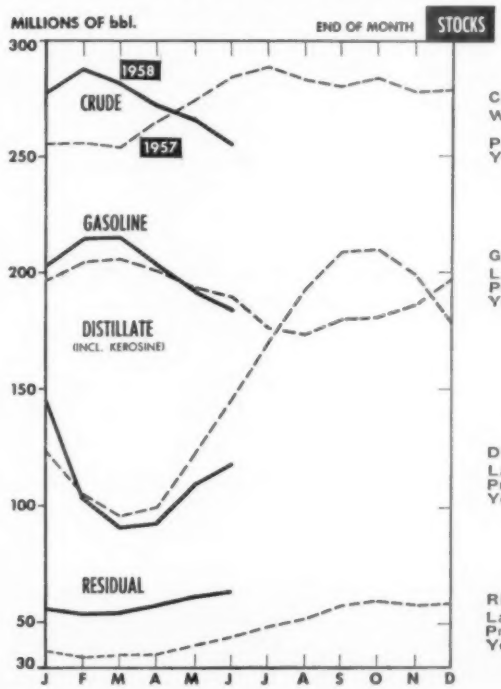
Latest week	6.439
Previous week	6.424
Year ago	6.882

TOTAL IMPORTS

Latest week	1.409
Previous week	1.679
Year ago	1.642

CRUDE IMPORTS

Latest week	.921
Previous week	1.046
Year ago	1.287



CRUDE STOCKS

Week ended 7-5	255.2
Previous week	258.1
Year ago	279.0

GASOLINE

Latest week	182.2
Previous week	183.4
Year ago	182.0

DISTILLATES

Latest week	134.5
Previous week	131.0
Year ago	154.9

RESIDUAL

Latest week	66.2
Previous week	64.8
Year ago	47.0

The revolt in Iraq already is sparking inquiries for crude, aviation gasoline, and jet fuel in the U.S.

Though there is no positive evidence now that supply from Middle East areas will be cut off, European refiners—recalling the all-too-recent Suez shutdown—are being cautious about future supply availability.

Any measurable additional demand on the U.S. industry would require substantially higher crude production and refinery operating rates.

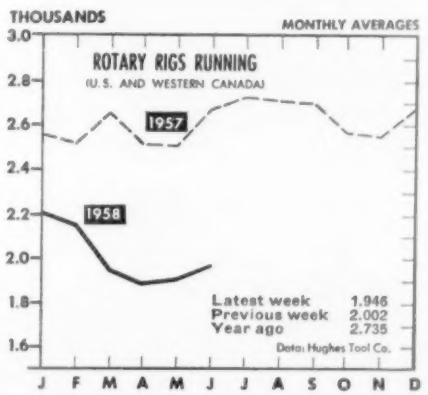
The reduced operating schedules during most of this year have reduced inventories in nearly all areas east of the Rockies to near minimum working levels.

According to the latest reported figures, crude stocks east of the Rockies are below the "absolute" minimum.

The low level of inventories already is sparking higher operating rates for both producers and refiners. August domestic crude production may run almost 200,000 b/d above the July rate. Refinery runs have been inching up steadily, but the tight crude supply may cause some reductions in runs later this month.

Possible export requirements resulting from the Middle East crisis would provide a big impetus to demand, which hasn't shown much spark this year. For the first six months, domestic demand was up 0.8% while total demand dropped 4.4%.

Total demand perked up in June, averaging 2.5% higher than last year. But June, 1957, was a poor demand month, which detracts from the importance of the gain recorded this year.



The Market Trend

At the Gulf: 0.75c of the Road Back

The Gulf Coast is the strong spot this week. Two majors have had to jump into the market and buy spot cargoes of clean products to bolster their own supplies. Cargo trading is active.

Texas and Louisiana refiners already have recovered 0.75¢ of the declines in gasoline prices since the Suez crisis. The strongest sale last week was at "a minimum" of 10.75¢ for 90-octane regular. July gasoline is already cleaned out. Some refiners see strong prices for the product right through August.

And No. 2 fuel in cargo lots looks about as firm as it has ever looked in the middle of summer. The big buyers in New York are alerted, fearful of a price advance. They're nominating ships at an accelerated pace, hoping to get in under the wire.

Independent refiners have very little material to offer over the next 60 days. One in Corpus Christi reports that his stocks of No. 2 fuel are about 600,000 bbl. lower than at this time a year ago. Another sold his earliest gasoline, which was for July 27 loading, and can't scrape up any heating oil before the middle of August.

The major refiners are not overburdened with supplies, either. Half a dozen refiners along the coast were approached about selling some No. 2 fuel, and all of them declined. One major said he was asked to lend some No. 2 fuel for repayment in the fall ("which is the equivalent of three months' free storage"), and he turned it down.

Everything is not all optimism at the Gulf, however. Refiners aren't finding any more cheap crude these days. Also, as product prices push up, the urge to increase refinery runs gets almost overpowering.

"Product" imports are assuming an increasing role in the Gulf Coast area. At least three Gulf Coast refiners are importing oils that have funny names, such as "naphtha-distillates" and "distillate-naphthas"—all of which is cheap crude in disguise.

And Gulf Coast refiners can't effectively increase their output unless the products can compete in the Northern consumer areas. Texas refiners can tell you six reasons why No. 2 fuel looks strong. But the final test is that, at current levels, it will have to reach New York at 8.6¢, delivered.

Esso Ups Gasoline:

Esso Standard this week advanced gasoline prices at many points in the East. Most of the advances ranged from 0.3¢ to 1¢ a gal.

Soft Spot: No. 6 In the Midwest:

If clean products are strong at the Gulf, black oils certainly are weak in Chicago. You can easily find spot discounts up to 1¢ a gal. on No. 6 fuel oil. An open price break is expected.

In Michigan, the price of heavy crude may slump soon. One refiner up there says residual oil looks as weak as he has ever seen it.

Argentina Gets Some Crude:

Argentina picked up five cargoes of Kuwait crude to fill a summer gap, and the price worked out to about $2.30 a bbl., delivered. The f.o.b. price of the oil was $1.85, payable 120 days after unloading in Argentina; the freight was USMC-76%. The seller: Gulf Oil Corp.

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All Prices as of July 14

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U. S. Gulf Coast, cargoes
- **Gasoline, 98 oct prem** 12.25†-12.5
- **Gasoline, 92 oct reg** 11†-12.375
- Kerosine 8.625-8.875
- **Heating oil, No. 2** 8.375†-10.25
- **Gas oil, 48-52 d. i.** 8.625†-10.5
- Fuel oil, bunker "C" $2.25

Caribbean, cargoes
- Avgas, Grade 100/130 16
- **Gasoline, 93 oct research prem.** 11.25†
- **Gasoline, 87 oct research reg** 10.375†
- **Gasoline, 79 oct research** 9.625†
- **Gasoline, 70-72 oct motor method** 9.5†
- Kerosine 8.875
- **Heating oil, No. 2** 8.375†
- **Gas oil, 48-52 d.i.** 8.625†
- Fuel oil, bunker "C" $2.25

New York Harbor, barges
- Kerosine 9.35-9.6
- Heating oil, No. 2 8.85-9.1
- Fuel oil, No. 6 $2.57-2.65

Okla-Group 3, northern shpt, bulk
- **Gasoline, 89 oct reg** 11.5-12.5†
- Kerosine 9.5-10
- Heating oil, No. 2 8.25-8.875
- Fuel oil, No. 6 $1.20-2.00

Chicago, bulk
- Gasoline, 91 oct reg 12.5-12.8
- Heating oil, No. 2 9.5-10.3
- Fuel oil, No. 6 high sulfur 6.65-6.75

Los Angeles, rack
- Gasoline, 88 oct reg 11.5-13.6
- Diesel fuel, PS 200 10-11.25
- Light fuel, PS 300 $3.05
- Heavy fuel, PS 400 $2.50-2.70

Natural Gasoline, Grade 26-70
- FOB Group 3 4.5
- FOB Breckenridge, Tex. 4

LP-Gas
- Propane, Oklahoma (Group 3) 4-5

Pennsylvania Lubes
- Bright stock, 25 p.t. 22
- 200 vis. neutral, 25 p.t. 21

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent 95 v. i. 23-24
- Neutral, solvent, 200-210 vis. 19.5-20.5

Gulf Coast Lubes
- Bright stock, solvent, 95 v. i. 24
- Neutral, solvent, 200 vis. 20.5

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130 17.25
- Gasoline, 79 oct research 9.875
- Kerosine 10.125
- Gas oil, 48 d. i. minimum 10

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, 36.0-36.9 2.83-3.07
- North Dakota, 36.0-36.9 3.07
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9 3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9 2.92-3.22
  - West Texas, sweet, 36.0-36.9 3.00-3.07
  - West Texas, N. M., inter., 36.0-36.9 3.00
  - West Texas, N. M., sour, 32.0-32.9 2.86
  - East Texas, flat 3.25
  - Mirando, 28.0-28.9 3.31
- Illinois Basin, flat 3.00
- Pennsylvania Grade, Bradford dist., flat 3.90
- California, Signal Hill, 21.0-21.9 2.63-2.73†
- North Louisiana-Arkansas, 36.0-36.9 2.92-3.02
- **Wyoming sweet, 36.0-36.9** 2.90↓-3.00
- Wyoming sour, 32.0-32.9 2.71

Canada (flat prices, at the well)
- Acheson-Stony Plain (Alta.) 2.61
- Leduc-Woodbend (Alta.) 2.67
- Redwater (Alta.) 2.56
- Daly (Man.) 2.39
- Smiley (Sask.) 2.33

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 48.0-48.9, Tucupido 3.75
- San Joaquin, 41.0-41.9, Puerto la Cruz 3.34
- Oficina, 35.0-35.9, Puerto la Cruz 3.05
- Tia Juana, Medium, 26.0-26.9, Amuay 2.55
- Bachaquero, flat, Las Piedras 2.03-2.08
- Tarra, 38.0-38.9, San Lorenzo 3.08
- Lagunillas Heavy, flat, Cardon 2.25

†*Differential per deg. of grav. varies.*

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura 2.08
- Safaniya, 27.0-27.9, Ras Tanura 1.79
- Iran, 34.0-34.9, Bandar Mashur 2.04
- Iran, 34.0-34.9, Abadan 1.99
- Iraq, 35.0-35.9, Fao 1.98
- Kuwait, 31.0-31.9, Mina-al-Ahmadi 1.85
- Qatar, 41.0-41.9, Umm Said 2.23

Middle East, Eastern Mediterranean
- Arabian, 36.0-36.9, Sidon 2.49
- Iraq, 36.0-36.9, Tripoli, Banias 2.49

Far East, Cargoes, FOB Lutong, Sarawak
- Seria Light, 37-38 2.75

KEY TANKER RATES

(Last paid, per long ton, single voyage)

- U.S. Gulf-New York, clean (USMC —30%) $2.00
- **U.S. Gulf-N. Y., dirty (USMC —32½%) $1.92†**
- **NWI-USNH, dirty (USMC —55%) $1.22†**
- NWI-UK/Cont., dirty (Scale —57½%) 13/10
- Persian Gulf-UK/Cont., dirty (Scale —50%) 30/2*
- Persian Gulf-USNH, dirty (USMC —60%) $5.08

**Sterling.*

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Jackson 3-6951

Boston 6 Edward A. Callahan, Jr.
350 Park Square Bldg.
Hubbard 2-7160

Chicago 11 W. F. Holbrook
520 North Michigan Avenue
Mohawk 4-5800

Cleveland 15 J. E. MacArthur
1164 Illuminating Bldg.
55 Public Square
Superior 1-7000

Denver 2 J. W. Patten
Mile High Center, 1740 Broadway
Alpine 5-2981

Houston 25 D. O. Hanson
724 Prudential Bldg.
Jackson 6-1281

Los Angeles 17 Peter S. Carberry
1125 W. Sixth St.
Huntley 2-5450

New York 36 Edward A. Callahan, Jr.
Donald R. Thompson
500 Fifth Ave.
Oxford 5-5959

Philadelphia 3 W. A. Potter
6 Penn Center Plaza
Rittenhouse 6-0670

San Francisco 4 William C. Woolston
68 Post Street
Douglas 2-4600

Tulsa 3 J. A. Hartley
909 Enterprise Bldg.
522 South Boston
Gibson 7-5594

England, London E. C. 4 Herbert Lagler
McGraw-Hill Co., Ltd.
95 Farrington St.

DEPT/Service & Equipment Companies

W. T. POWELL, Continental-Emsco Co., Dallas, is the new president of the Petroleum Equipment Suppliers Assn. He succeeds **Grover Kilgore,** Halliburton Oil Well Cementing Co., Duncan, Okla. The new vice-president of PESA is **Wallace D. Wilson,** Wilson Supply Co., Houston. They were elected at the recent annual meeting of the PESA, in Quebec, Canada. New members of the PESA executive committee include the following district chairmen: **Frank L. Hereford,** Murray-Brooks, Inc., Lake Charles, La., southwestern district; **W. L. Butler,** W. C. Norris, Tulsa, Mid-Continent and Rocky Mountain district; **H. H. Peters,** Technical Oil Tool Corp., Los Angeles, Pacific district, and **Donald W. Mackie, Jr.,** Bradford Supply Co., Bradford, Pa., eastern district. Also a member of the executive committee is **Franklin E. Bernsen,** Lucey Products Corp., Tulsa, who is chairman of PESA's finance committee.

CECIL H. GREEN, chairman of Geophysical Service Inc., Dallas, has been appointed to a five year term as a director of the Massachusetts Institute of Technology.

M. D. Matthews

C. H. Green

REAR ADMIRAL MITCHELL D. MATTHEWS, USN (RET.), has been appointed manager of the service and repair division of De Laval Steam Turbine Co., at Trenton, N. J.

LLOYD C. FONS has been named Mid-Continent division manager for Birdwell, Inc. He will be located in the Robinson (Ill.) office. He was formerly personnel and training director for Birdwell.

FRANK W. WELDON is sales manager of the Dallas district for Kelite Corp., manufacturer of industrial chemicals for cleaning and metal finishing, and steam cleaning equipment. Weldon, with Oakite Products, Inc., New York, for the past 12 years, will be responsible for sales in northwestern Texas, southern Kansas, Oklahoma, southwestern Missouri, northern Arkansas, western Tennessee and Kentucky, and northern Mississippi.

MOBILE DRILLING & ENGINEERING, INC., Indianapolis, will be known as **American Testing & Engineering Corp.,** specializing in contract drilling, laboratory testing, and design recommendations. The company will no longer be a subsidiary of Mobile Drilling, Inc., also in Indianapolis.

WILLIAM A. BALTZELL has been appointed industrial sales manager for Oakite Products, Inc., with headquarters in New York. Baltzell, a director of the company, has been assistant sales manager, in New York, since 1953. In his new position, he will be responsible for the sales staff of the industrial cleaning and metal treating materials company.

W. A. Baltzell

C. W. Parker, Jr.

CHARLES W. PARKER, JR., was named to the new position of director of sales promotion for Allis-Chalmers Industries division of Allis-Chalmers Mfg. Co., in Milwaukee. He was formerly manager of the company's Philadelphia district. **A. R. Tofte,** formerly manager of the advertising and industrial press department, is manager of the newly established publications and industrial press department. **J. W. Murphy,** formerly assistant manager under Tofte, is manager of the new advertising department. These two men will be responsible for the expanded activities of the former advertising and industrial press department also in Milwaukee.

DALE DeLONG and **R. F. HUGHES** have joined the sales staff of Grove Valve & Regulator Co. DeLong is assigned to the New Orleans area, and Hughes to the Tulsa area.

CLARENCE SUBLETT was appointed vice-president in charge of Midwest operations, and **WILLIAM CARROLL** vice-president in charge of the New York office and export division, of Franklin Supply Co. Sublett, whose office will be in East Chicago, Ind., was formerly vice-president of Franklin's Canadian affiliate and the export division, in New York. Carroll has been district manager of the Mid-Continent area, with headquarters in Tulsa.

R. VAUGHAN HOLTON has been named manager of the Canadian division of Fluid Packed Pump Co., Los Nietos, Calif. He was formerly assistant northwest division manager.

PAUL D. MOON is manager of sales promotion for Broderick & Bascom Rope Co., St. Louis. Moon, formerly export manager for the company, will be in charge of advertising and sales for Yellow Strand products in all markets.

BOB OWEN is the new president, and **PAUL NUCKOLLS** the new vice-president, of Lamons Metal

Gasket Co., Houston, which the two men recently purchased. The company, previously known as W. A. Lamons Co., manufactures metallic and non-metallic gaskets for customers in the Gulf Coast area.

PRECISION EXPLORATION CONSULTANTS, LTD., and **CONSOLIDATED GEOPHYSICAL SURVEYS,** both with headquarters in Tulsa, Okla., have joined their facilities under the name of Precon, a world-wide geophysical service. Precon will maintain offices in Tulsa and Calgary.

VERNON S. WALKER has been appointed steel valve sales representative in the steel valve division of Kerotest Mfg. Co., Pittsburgh. Walker, with headquarters in Tulsa, will be responsible for the Oklahoma and Kansas territories, and also a portion of Missouri.

V. S. Walker

S. H. Shocklee

S. H. SHOCKLEE has become district manager for Continental-Emsco Co. at El Dorado, Ark. He will be responsible for the company's stores in El Dorado and Magnolia, Ark., and Shreveport, La. **B. R. Greive** is manager of Continental-Emsco's new D+B pump shop in Luling, Tex. He was formerly store manager at McAllen, Tex.

JACK R. RUSSELL is assistant manager of field sales for Otis Engineering Corp., at its general offices in Dallas. **Johnny Wall** replaces Russell as manager of the western division, at Odessa.

MARVIN F. HALL was promoted to consulting gas engineer for Ebasco Services, Inc., with headquarters in New York. He has been in the consulting engineering department since 1951.

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Injunction Denial is Oil's Gain

NOT THAT PETROLEUM WEEK ENDORSES the voluntary oil imports program in its entirety, but last week's action of the federal district court at Washington, D.C., in denying a request for an injunction to set it aside actually is a victory for the petroleum industry, as a whole.

It's true that many within the industry, particularly independents and Eastern States Petroleum & Chemical Corp., which sought the injunction, are unhappy with the voluntary plan. The independents are pressing for mandatory controls, a move which, in the end, could lead to federal control of the entire petroleum industry.

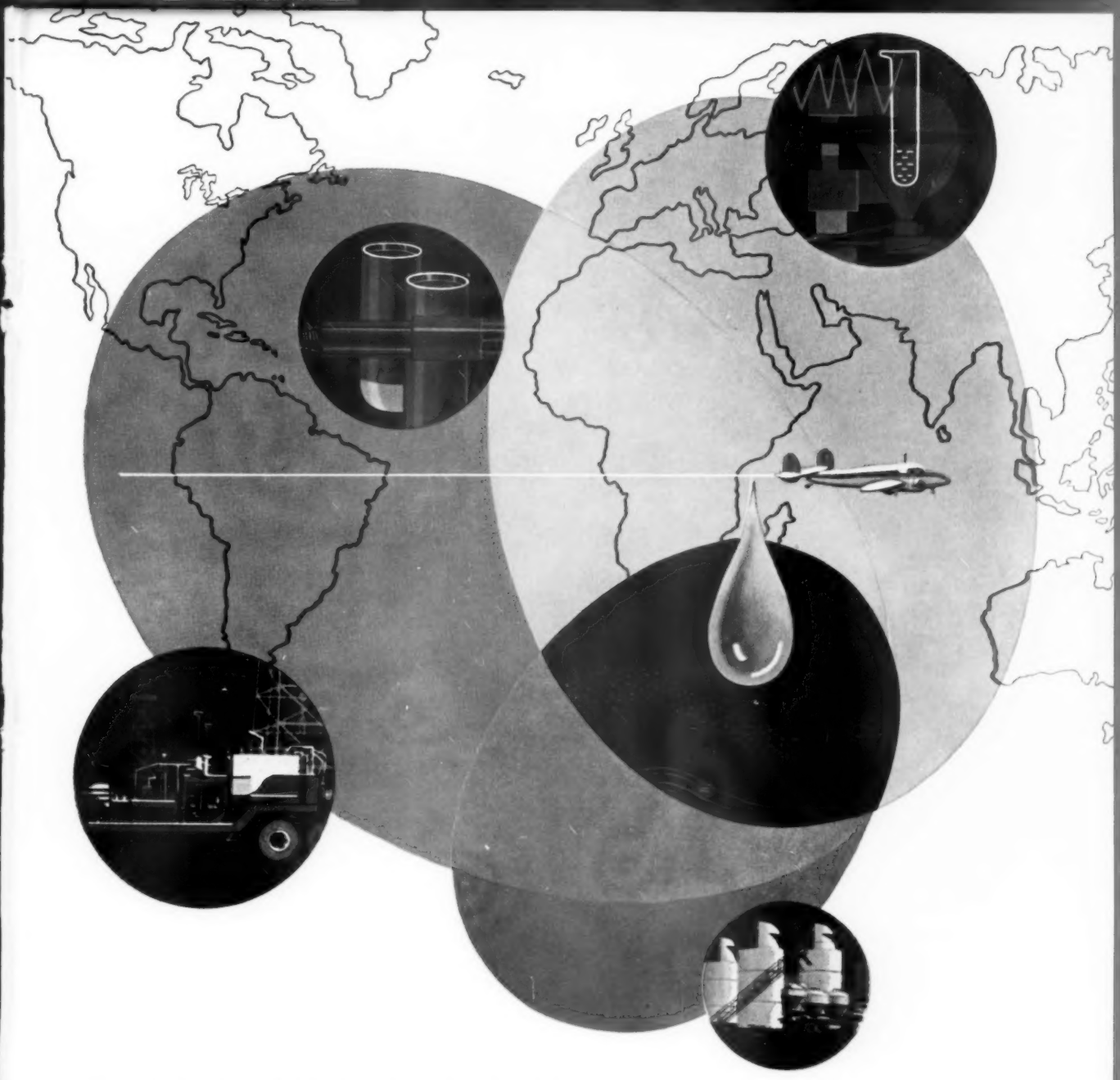
But the fact remains that the voluntary system, despite some inequities, is accomplishing its purpose—the holding of imports to within a given level. Those who seek mandatory controls actually are displeased with the "given level," not with the intent of the program. Those who would toss the entire program out the window indirectly are seeking to correct inequities.

OUR SYMPATHY GOES OUT to those caught in these inequities—which, in the main, result from the historial approach of the program. Back in 1955, when the first voluntary plan was initiated, companies were told to cut back 7%. Some did, some didn't. And that is where the rub comes. For, when the present voluntary plan was made effective, the historical importing record of companies for 1954, 1955, and 1956 was used as a base.

This meant that the companies that actually thumbed their noses at the program during the three years were given an imports quota based on violations. And those who abided by the request found themselves with an even smaller allotment. In other words, they were penalized for being good. Then there are the newcomer contingent and the "brokers" of crude, some of whom received quotas approaching maximum refining capacities, while others were given quotas that approach only the "token" level.

ALL OF THIS naturally has created unhappiness with the program on the part of some.

But if you were buying apples, you wouldn't throw the entire bushel away simply because there were a few bad ones in the basket.



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